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Sociological Impact of Using Digital (Web-based) Analyses on Performance Measurement and Optimization of Digital Marketing among Young Managers (Case study: Digital-based Companies in Tehran)

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Abstract

This research aims to study the effect of using digital (web-based) analyses in performance measurement and optimization of digital marketing in digital-based companies in Tehran. The data collection tool was a researcher-made questionnaire. A panel of experts and supervisor were asked to measure the validity of the questionnaire. For reliability analysis of this tool, Cronbach's alpha test was applied; the alpha value was higher than 0.7, indicating the required reliability. The statistical population of this research is marketing managers and specialists of web-based commercial companies in Tehran. The questionnaire was distributed among 110 young marketing managers and experts of web-based corporations in Tehran. Structural equation modeling (SEM) test was performed via Smart PLS software in order to scrutinize the research hypotheses. The results of data analysis showed that web-based analyses have a positive and meaningful impact on performance measurement and optimization of digital marketing.

Keywords: Web-based analyses, web-based companies, Digital analyses.

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1. Introduction

Recent technological advancements have formed a new digital era in which extensive use of computers, communications, transportation, and other technologies has a deep impact on servicing methods applied by companies. Accordingly, given the changes in digital era technologies, businesses need to adapt to these changes to survive and make profits. Such changes and the emergence of innovations have also changed customer behavior as well as marketing practices (Lavalle et al., 2011). Some of the key innovations that have been activated by Information technology (IT) are the Internet, the World Wide Web, websites, search engines, email platforms, social media operating systems, and mobile devices. These innovations have increased the volume and access to digital data in everywhere (i.e., the information transfer at any time in any place), as well as the rapid and accurate exchange among individuals and organizations through digital communication channels (Chaffey& Patron, 2015).

The high-speed digitization processes challenge young marketing managers in the market innovation process. This challenge emerges due to the fact that attracting customer by traditional methods faces a serious issue and requires new approaches to affect customer behavior (Lingqvist, 2015). In this regard, the question posed to all companies looking to use web-based applications is how to create a successful website for the electronic market. Firms often regard electronic-commerce (e-commerce) features to improve their competitive status. Therefore, website design is a crucial topic, and its use is considered to be an essential concern. The usability of electronic marketing refers to the dominance or ease of use by customers without thinking about communicating with it (Tsekouropoulos et al., 2012).

As interactions between customers and businesses increase due to the use of digital channels, digital companies have found out that it is essential to measure their interactions and performance (Lingqvist, 2015). In addition, the monetary marketing outcomes as an advantage have been considered vastly by senior managers and have enhanced marketers' responsibility to their performance more than ever. Thus, most of these young managers have put further efforts on marketing performance evaluation because of its chief impact

on business performance, profitability, senior young managers' satisfaction, and good reputation of marketers. As digital analysis has provided a load of information and data affecting customer behavior for marketers, the marketing performance evaluation relies on the firms' ability to process information and data in practice (Lavalle et al., 2011). Nevertheless, less organizational processes and measures have been made on using digital analysis (Gillin, P., & Schwartzman, 2011). Digital media measurement has been launched as one of its greatest benefits compared with other media since the mid-1990s since the advent of internet marketing. Many marketers believe that the ability to measure the interaction of website visitors through logging in systems leads to the enhanced awareness levels of the efficiency of marketing communications. Although web analysis services have been well established, it appears that web analysis technology is still not extensively applied as a practical marketing element. Despite the high acceptance level of this tool by corporations, their usage is still astonishingly low (Chaffey, 2015).

Meanwhile, a variety of digital tools also makes it challenging to decide on how to allocate marketing and budgeting efforts in different instruments to achieve optimal results (Valos, Ewing & Powell, 2010). The use of digital tools, such as web analysis including measuring, collecting, analyzing, and reporting internet data to comprehend and optimize the internet application has contributed impressively to optimizing and improving the marketing performance evaluation (McDonald, 2010). Many web analytics products/services are available in the market in a wide range of complexity and forms. The capability and quality of these products/services are different one to another. Moreover, the reliability of web analytics tools is a major concern for companies that are planning to approve them. Therefore, when deciding to adopt such a device, the reliability of the web analytics product should be taken into consideration. In the long term, choosing a web analytics tool is strategic. These tools provide the basis for competitive decision-making. The analysis quality has a direct impact on the effectiveness of the decisions. The use of a web analytics tool is likely to be interlinked with internal organizational decision-making processes. The data needed to generate the analysis is usually collected for an extended period and may not be controlled by the organization,

depending on the tool. Therefore, selecting an appropriate web analytics tool that meets the needs of the organization is a vital issue (Nakatan, & Chuang, 2011).

To our knowledge, due to the lack of specific and comprehensive criteria in web performance measurement in business firms, it has been challenging to make the accurate decision to pick the factual tool such an analysis. The lack of these criteria surely destabilizes achieving the right logical results to optimize web analytics in these firms. To tackle such challenges, therefore, the use of a comprehensive web analytics approach can be useful for web-based companies. Thus, to create a structure that addresses the intangible characteristics in web analysis and achieve the theoretical and practical aims in this arena, the present study was conducted to investigate the influence of using digital (web-based) analyses to assess digital marketing performance and optimization in digital-based businesses of Tehran. Hence, the central question of the present research is that how using digital analyses (web) affects measuring digital marketing performance and optimization in digital-based corporations in Tehran.

2. Theoretical Framework

Web analysis is defined as "measuring, collecting, analyzing, and reporting internet data to comprehend and optimize the web use" (Web Analytics Association, 2008). In line with this definition, one of the rare web analytics experts, Avinash Kaushik (2010), defines this notion as "analyzing quantitative and qualitative data from the website and competing to constantly improve the online experience of clients and potential customers toward achieving the desired results (both online and offline)" (Järvinen, 2016).

In addition to facilitating communication in the digital environment, various industries also have developed digital tools to achieve better outstanding marketing objectives. Owing to these tools, it is possible to evaluate marketing activities more accurately by improving the young marketers' capability to access and process data. Since results assessment is attained by reconstructing and discovering innovative techniques, the new era of activities created for the control of new optimal efforts needs to be re-

evaluated. New and innovative techniques with advances in information technology not only change customer behavior but also affect marketing practices (Leeflang et al., 2014). In the end, customer behavior changes with a change in consumption habits, communication pattern, and in shopping trips. The internet as one of the most critical media in the world has a significant impact on these changes. This technology is applied by numerous people as the primary source of information. In this regard, near 3 billion searches are done per day on Google (Nakatani, K., & Chuang, 2011).

Worldwide web indexes show that users use the Internet on average of 2.53 hours daily. About 41% of these hours are for general consumption of digital media (Bennett, 2015), such as sharing 433 thousand posts in Twitter, uploading 67 thousand photos on Instagram, and 306 hours of video on YouTube. The media usage pattern has changed quietly from its traditional form (Hutchins, 2015) to the so-called "multimedia" era (Lin & Venkataraman, 2013). Given the cost-effectiveness and customer behavior change, the results of investing in web analysis are better measured compared to the results of traditional analyses (Henning Tora et al., 2010). According to available data, digital analysis reduces the information asymmetry between buyer and seller and improves young marketers' performance evaluation, owing to the extensive use and reliance of customers on the internet to obtain primary and necessary information. In other words, digital marketing bridges modern e-technology to market and customer psychology. As a result, marketing performance evaluation has emerged as a necessary issue (Gartner, 2013).

Overall, there are three sorts of digital analytic tools in the industrial sector: 1) web analysis, 2) social media monitoring, and 3) marketing automation. The web analysis consists of data such as email, search engine, advertisement presentation, and visitor behavior during the visit to the website. Such information may optimize the structure and content of the site and maximize the outcomes (Nakatani, K., & Chuang, 2011). Social media monitoring also enables the company to see the value of online conversations associated with companies, industries, and specific marketing campaigns (Sponder, 2012). In this context, marketing automation refers to the personalization of marketing activities automatically by investing in behavioral techniques similar to web

analysis (Hutchins et al., 2015). Technically, the above tools are software to collect site visit resources and navigate visitor routes based on tags and cookies, which present data in a meaningful manner (Nakatani, K., & Chuang, 2011). These tools allow the industrial sectors to track customer behavior in digital channels and evaluate their responses for better marketing. Traditionally, marketing has been assessed by analyzing marketing productivity and auditing with an emphasis on financial input-output rate of marketing and health of marketing activities in a firm (Clark, 2001). In marketing productivity, there are two challenges of the relationship between productive activities with long-term financial impacts (Dekimpe & Hausns, 1995) and the separation of the effects of certain marketing activities from others (Pavlou 2000). Clearly, marketing performance evaluation is a problematic issue that highlights seasonal income and seeks long-term performance (Webster et al., 2005). Web analysis computes the number of clicks on a firm's website through inserted tags in a customer link to a specific page (Gartner, 2013). Different studies have detected the current deficits and paved the way for their eradication. Farhadi et al. (2018) investigated customer categorization via data mining based on neural network algorithms and decision tree type. These researchers reported that websites have the largest database available and relevant to customers through data processing capabilities. The discovery and analysis of customer data on the web allow organizations to improve their databased decisions and their decision-making strategies. Further, Mohammadi et al. (2018) investigated the role of internet marketing in the tourism industry growth. They found that internet marketing has a positive and significant impact on the tourism industry growth through network processing competencies and strategic management orientations. Mousavi et al. (2018) studied the role of information and communication technology as well as e-commerce in international marketing and business. They specified that the internet could significantly improve communications with customers, suppliers, and actual and potential international partners. Hasanpour (2012) investigated the opportunities and challenges of internet advertising management in a novel technology scenario. This researcher put highlighted the fact that internet marketing has a wide-ranging scope since it

covers a wide range from the internet, email, and wireless to a digital client database management system and electronic customer relationship management. Godey et al. (2016) studied the effect of social network-based marketing efforts on the unique value and consumer behavior of luxury brands. According to their results, in the area of luxury goods and brands, social network-based marketing might affect the specific value of these brands at initial stages and thus touch consumer behavior. Gilikn et al. (2014) studied marketing communication methods in the digital era and the management guidelines for integrating social media. In this research, the authors conducted case studies to realize how managers place social media in a marketing communications strategy. They provided some insights on how brand managers localize social media within the communication strategy and utilize different systems of social media to comprehend and respond to individual customer needs. Further, Leeflang et al. (2014) investigated marketing challenges and solutions in the Digital Era" and presented some solutions to utilize the marketing benefits in the digital era. According to their findings, filling "talent gaps", modifying "organizational design", and implementing "practical criterion" provide the greatest opportunities for improvement of web-based businesses. Considering the originality of the digital marketing tactics and the need for professional marketers in this field, the present study addresses the impact of the using digital (web-based) analyses to measure performance and optimization of digital marketing in digital-based businesses in Tehran.

3. Research Hypotheses

Web-based analyses have a meaningful impact on digital marketing optimization

Web-based analyses have a meaningful impact on digital marketing performance

4. Research Methodology

The data collection tool used in this study was a researcher-made questionnaire. In addition, opinions of young experts and supervisors were

used for measuring the tool's validity. For the reliability evaluation, Cronbach's alpha test was used; the alpha value was higher than 0.7, indicating the required reliability. The statistical population of this research includes 150 marketing managers and specialists of web-based commercial companies in Tehran. The questionnaire was distributed among 110 young marketing managers and experts of web-based companies in Tehran. According to Morgan's table, 110 questionnaires were used for statistical analysis. The results were analyzed using SmartPLS and SPSS software packages.

5. Results

5.1. Exploratory Factor Analysis (EFA)

For EFA, categorization of questions, as well as the discovery of variables and related factors, it is necessary to set a precondition for this process. Initial preconditions for EFA are as below:

5.2. Sufficient Sample Size

Symmetry (no direction) relationship of questions with discoverable factors

Table 1. Results of the Kaiser-Meyer-Olkin (KMO) index and Bartlett's test

The KMO sampling adequacy coefficient		0.787
Bartlett's sphericity test	Chi-Square	5164.300
	freedom Degree	1378
	Significance level	0.000

The KMO index is used to the sufficiency of sample size, which was 0.787 and above the recommended acceptance level of 0.7.

The Bartlett's test was performed to assess symmetry and observed that sig value is 0.000, which is smaller than 0.05, suggesting that relationships are spherical or symmetric.

The communalities table that shows the explanation level of the variance of each question is higher than 0.5 for each question.

The table of Total Variance Explained provides unique values on how many sets and when each of them is made. This particular value is above unity, and 11 sets have been formed.

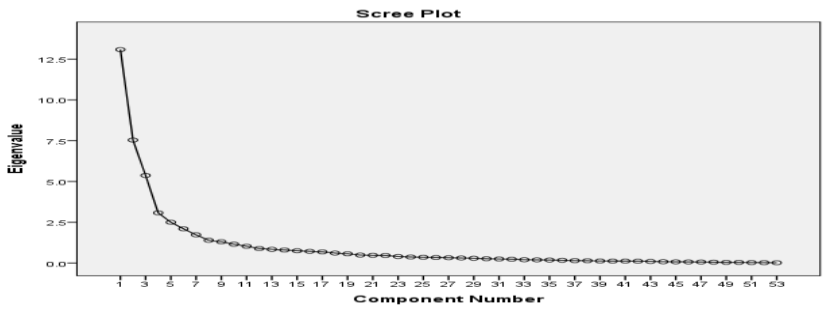

Figure 1. Aggregate chart of eigenvalues of the questions

Component matrix table: In this table, eight components are specified before the varimax rotation. To categorize each question, the rotating table of factors is used.

In the Rotated Component Matrix table, the construct validity is examined.

The largest factor should be picked up greater than 0.5 to examine the convergent validity in each row.

To examine the divergent validity, the selected number should be greater than 0.3 of its counterpart row.

Table 2. Factor rotation matrix of variables

	Component										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
AQ1	.787	-.003	.188	.106	.321	.082	.020	.068	.105	-.003	-.011
AQ2	.761	.037	.144	.019	.239	.079	-.094	.078	.040	-.015	-.123
AQ3	.789	-.001	.116	.100	.102	.037	.134	.072	-.065	-.042	.139
AQ4	.725	-.075	.196	.138	.202	.027	-.019	.093	.051	.127	-.115
AQ5	.778	.087	.052	-.017	.102	.071	.057	.150	-.019	-.136	.014
AQ6	.761	.096	.053	.026	.248	.259	-.035	.056	-.046	-.099	.084
AQ7	.822	.030	.150	.033	.173	.070	.103	.084	.081	.127	-.008
AQ8	.824	.057	.186	.097	-.015	.027	-.004	.025	-.039	.020	-.096
AQ9	.761	.002	.186	.157	.065	-.021	-.066	.060	-.021	.166	.046
AQ10	.804	.011	.284	.083	.096	.015	.109	-.055	.071	.050	.101
BQ1	-.028	.837	-.091	.009	-.072	.146	.031	.094	-.073	.161	.180
BQ2	.028	.836	.065	.085	.130	.052	.024	-.149	.123	.018	-.153
BQ3	-.078	.853	-.141	.088	.063	.075	.095	-.038	.022	.036	.056
BQ4	.115	.690	-.056	.038	-.066	-.109	.245	-.008	.396	-.017	-.179

BQ5	.042	.812	-.048	.061	.059	.132	.083	.092	.008	.150	.217
BQ6	-.020	.887	-.031	.050	.038	-.001	.065	-.056	.200	-.034	-.185
BQ7	.049	.871	-.050	.022	-.034	-.008	.027	.053	.091	.082	-.071
BQ8	.107	.866	.031	-.026	.021	.099	.048	-.068	.072	.033	.088
CQ1	.107	.332	.224	.132	-.025	.249	-.307	-.143	.564	.187	-.015
CQ2	-.073	.183	.048	.112	.121	.321	.099	.015	.733	-.121	.055
CQ3	.075	.453	-.072	.028	-.058	.031	.075	.091	.774	.112	-.010
DQ1	.030	.111	.180	-.120	-.059	.179	.034	.097	-.096	.109	.778
DQ2	.048	.006	.303	-.129	-.081	.107	-.014	.157	-.010	-.037	.808
DQ3	.066	.016	.185	-.004	.052	.141	.072	-.014	-.014	-.078	.840
EQ1	.047	.167	.056	.803	.190	-.093	.128	.082	.017	.117	-.093
EQ2	.123	-.006	.224	.860	-.008	-.091	-.094	.133	.124	-.047	-.026
EQ3	.151	-.005	.138	.868	.069	-.019	.023	.042	.080	-.078	.072
EQ4	.082	.058	.091	.598	-.020	-.196	-.275	.041	.076	.156	.358
EQ5	.129	.042	.253	.748	.012	-.110	-.183	.096	.096	.035	.180
FQ1	.043	.072	.169	-.046	.115	.009	.709	-.028	.122	.364	.105
FQ2	.069	.309	.063	-.038	-.008	.140	.781	.042	.053	.083	-.066
FQ3	.088	.155	.042	-.017	.202	.282	.661	-.243	-.093	.025	-.077
GQ1	.190	-.065	.342	.263	.080	-.049	-.140	.772	-.057	.018	.033
GQ2	.215	-.031	.352	.320	.153	-.094	-.109	.726	-.049	.041	-.031
GQ3	.298	.025	.224	.170	.278	.072	.043	.663	.148	-.015	-.013
HQ1	.177	.360	.158	.025	-.142	.613	.202	.117	.105	.035	.014
HQ2	.160	.138	-.019	-.007	-.039	.772	.202	.038	.172	.084	.033
HQ3	.152	.030	.098	-.008	.079	.834	.008	-.135	.088	.035	-.066
IQ1	.221	.327	-.052	.078	.077	.057	.096	.087	.089	.750	-.119
IQ2	-.090	.165	.118	-.016	.151	.112	.337	-.054	-.048	.717	.120
JQ1	.370	-.024	.027	.021	.714	-.044	-.019	.078	.020	.141	-.137
JQ2	.199	.019	.098	.027	.781	.032	.169	.153	-.004	-.021	.031
JQ3	.189	-.001	.100	-.046	.764	-.052	-.053	.025	.044	.104	.304
JQ4	.307	.056	.049	.052	.808	.027	.122	.146	.040	-.011	-.026
JQ5	.399	.113	.114	.126	.673	.003	.047	-.091	-.087	.062	-.253
KQ1	.175	-.067	.756	.313	.083	.116	.015	.167	-.028	.141	-.253
KQ2	.113	-.119	.762	.161	.123	.112	.041	.183	-.025	.119	-.340
KQ3	.253	-.083	.744	.245	.127	.122	.043	-.022	.008	-.108	.290
KQ4	.210	-.037	.816	.149	.032	-.062	-.007	.087	.036	-.105	.182
KQ5	.304	.047	.726	.192	.038	.008	.170	.196	.060	.014	.109
KQ6	.180	-.015	.770	.138	.048	.173	.137	.080	.111	-.045	-.170
KQ7	.226	-.078	.757	.224	.056	.019	-.099	.142	-.078	-.034	.154
KQ8	.219	-.025	.798	.249	.034	-.112	.049	.019	.010	.202	-.045

Kolmogorov-Smirnov test

$$\begin{cases} H_0: Observation \text{ probability distribution is normal.} \\ H_1: \text{Observation probability distribution is not normal.} \end{cases}$$

Table 3. The results of the Kolmogorov-Smirnov test

the Variable	Significance level
data processing capability	0.000
system and data Management	0.005
data collection capability	0.003
information provision capability	0.000
data integrity capability	0.000
improvement and change strategies	0.011
indirect cost management	0.000
direct cost management	0.000
risk management	0.000
digital marketing optimization	0.001
digital marketing performance	0.001

Given the significance level obtained from this test (Table 3), it is observed that the significance probability values have been estimated less than the type 1 error of 0.05, suggesting the confirmation of the first hypothesis in this test. Since the null assumption of this test is based on the normality of experiential scores distribution, it can be assumed that the distribution of the scores of each research variable has not been reasonable at the error level of 0.05. Thus, the Smart PLS software was applied in the structural equation modeling (SEM).

5.3. Reflexive Measurement Model Tests

Before performing the initial tests, the most critical initial examination of the refractive measurement model has to be carried out. This test is a one-dimensionality check that measures the homogeneity of the questions of each variable.

5.3.1.The Homogeneity Test

Factor loads of all items were tested and found that each factor load is above 0.7

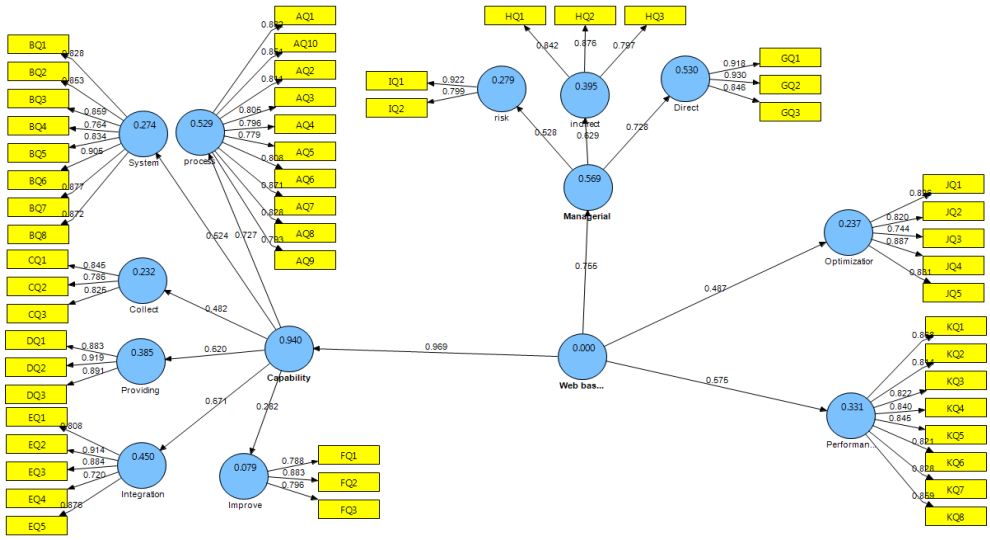

Figure 2. Measurement model in the estimation status of standard coefficients

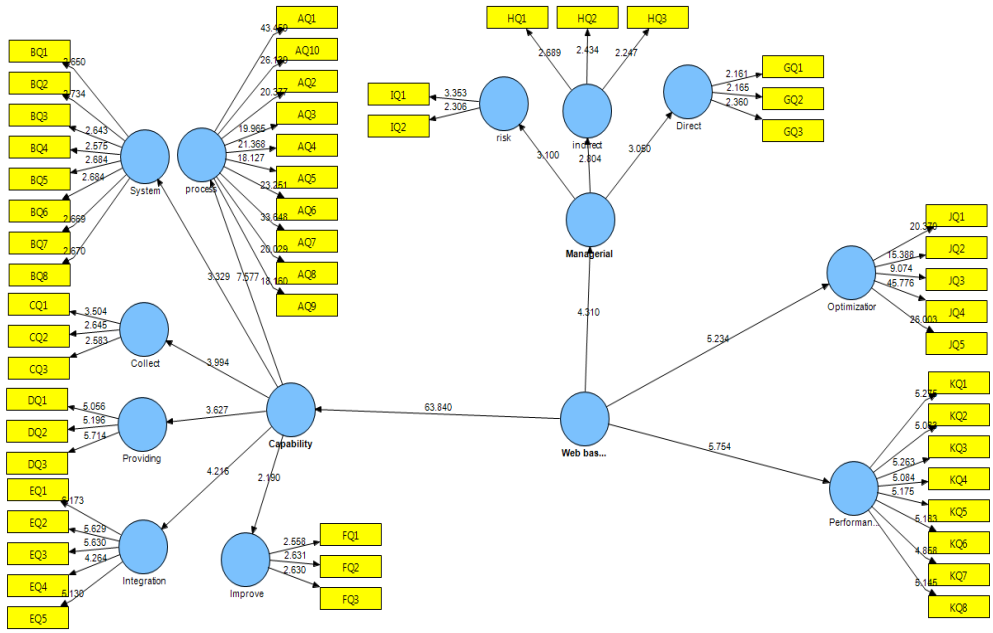

Figure 3. Measurement model in estimation status of coefficients significance

5.3.2. Model Reliability Test

1. Cronbach's Alpha: Internal correlation of questions outside the model

The Cronbach's alpha value of components should be greater than 0.7; thus, the internal relationship of questions outside the model is confirmed.

2 .The Dillon-Goldstein's Reliability (Compound or Composite Reliability-CR)

CR coefficients' values show that the internal consistency of questions within the model is established.

If the model is new, CR above 0.6 is confirmed. If it is at maturity level, CR should be above 0.7 (Kline 2010).

3. Communal Reliability: According to this criterion, the generalizability level of the model is measured. In other words, the question can maintain the contribution in explaining its variance in each model (Bryne 2005). Communality index is estimated in SmartPLS for each question, reported for each variable, and finally averaged over the sum. This index should be above 0.5 for each variable.

According to the results of these three reliability tests, the model is reliable.

5.3.3. Model Validity Test (Structural Validity)

5.3.3.1. Convergent Validity Constraints

1. The values of the factor loads of all questions should be higher than 0.7.

2. All factor loads should be statistically significant.

It can be seen that all coefficients are statistically significant at a 99% confidence level and are not in an acceptable range (1.96 and 1.96, respectively).

3- AVE for each variable

The AVE values for each variable, based on the table, are above 0.5.

4- CR> AVE

By comparing the values acquired, it is specified that all CR values are larger than AVE; thus, the fourth condition (i.e., CR > AVE) of convergent validity is established.

5.3.3.2. Divergent validity

5.3.3.2.1. Test of Co-Width Loads

In this test, it is specified that each question belongs precisely to its own variable and does not correlate with the questions of the other variables.

Table 4. Divergent validity review by testing co-width loads

	process	System	Optimization	Performance	Collect	Providing	Integration	Improve	risk	indirect	Direct
AQ1	0.881583	0.056054	0.579592	0.438236	0.174606	0.221674	0.237842	0.137799	0.154751	0.214779	0.415350
AQ10	0.850768	0.066978	0.404435	0.484710	0.131696	0.158330	0.243783	0.204652	0.189383	0.214748	0.338456
AQ2	0.810943	0.062326	0.493442	0.358846	0.121130	0.107406	0.171805	0.084773	0.087231	0.207539	0.362769
AQ3	0.805283	0.031408	0.429067	0.354314	0.027795	0.143143	0.223543	0.156987	0.091996	0.224123	0.333835
AQ4	0.795887	-0.018914	0.477887	0.431763	0.095239	0.220599	0.271014	0.112513	0.162900	0.173905	0.404056
AQ5	0.778930	0.099481	0.391672	0.275435	0.092546	0.117396	0.075909	0.114098	0.065705	0.211257	0.330864
AQ6	0.808171	0.120911	0.494687	0.283188	0.120928	0.137213	0.123307	0.098505	0.108215	0.333518	0.299234
AQ7	0.870952	0.087827	0.485866	0.393717	0.171213	0.131105	0.176522	0.219781	0.257690	0.258251	0.373990
AQ8	0.828034	0.075474	0.338502	0.402976	0.096562	0.186313	0.219259	0.092041	0.150648	0.199649	0.329777
AQ9	0.792920	0.032188	0.378980	0.413330	0.065814	0.213336	0.302166	0.045694	0.208745	0.157559	0.374904
BQ1	-0.008108	0.828120	-0.023461	-0.111877	0.323438	0.041143	0.049703	0.245436	0.354252	0.290259	-0.029174
BQ2	0.090108	0.852616	0.158786	0.024688	0.480699	0.107807	0.139750	0.315567	0.317360	0.252364	-0.006447
BQ3	-0.040456	0.858538	0.045125	-0.161290	0.389377	0.088872	0.076260	0.280753	0.311650	0.233733	-0.078311
BQ4	0.106513	0.763583	0.050479	-0.030244	0.499825	0.060165	0.089928	0.306596	0.288235	0.235926	-0.039804
BQ5	0.107729	0.834094	0.101364	-0.026285	0.404889	0.105752	0.105627	0.303100	0.387803	0.250308	0.057213
BQ6	0.009965	0.905216	0.068384	-0.064357	0.494146	0.076549	0.086174	0.263676	0.287092	0.253218	-0.042231
BQ7	0.063748	0.876859	0.050064	-0.054064	0.397514	0.071385	0.075279	0.201144	0.349363	0.253005	-0.014228
BQ8	0.135895	0.872296	0.093234	-0.000085	0.459390	0.039478	0.042659	0.311782	0.311692	0.295680	-0.030798
CQ1	0.184710	0.385447	0.026381	0.215767	0.844603	0.194562	0.224889	0.028774	0.196630	0.312432	0.087357
CQ2	0.036415	0.301554	0.077260	0.081529	0.786483	0.156246	0.120460	0.182430	0.067984	0.342038	0.060497
CQ3	0.085398	0.555472	0.026191	-0.020571	0.825394	0.027476	0.120740	0.166455	0.293138	0.310170	0.034861
DQ1	0.159178	0.137963	0.036864	0.393245	0.154715	0.882842	0.690884	0.054212	0.169689	0.166440	0.325382
DQ2	0.184782	0.034512	0.033803	0.509952	0.131896	0.918578	0.761578	-0.027229	0.054750	0.116007	0.423793
DQ3	0.194540	0.064883	0.130888	0.411646	0.129270	0.890877	0.754898	0.031400	0.066901	0.149394	0.309492
EQ1	0.181208	0.216739	0.263334	0.293823	0.169100	0.630981	0.807570	0.133401	0.208303	0.000485	0.338407
EQ2	0.239726	0.031736	0.111715	0.454275	0.188498	0.799302	0.914141	-0.104450	-0.000587	-0.012263	0.451757
EQ3	0.256413	0.047315	0.178210	0.395626	0.149908	0.786548	0.884183	-0.017046	0.043410	0.051626	0.389397
EQ4	0.125699	0.056292	0.042948	0.233368	0.150561	0.432866	0.720038	-0.177590	0.018130	-0.111099	0.286341
EQ5	0.232895	0.060246	0.121072	0.441333	0.169386	0.638024	0.876484	-0.117136	0.040132	-0.013071	0.422039
FQ1	0.119049	0.168872	0.207136	0.196778	0.131759	0.006316	-0.009324	0.787921	0.425646	0.223787	0.002115
FQ2	0.116601	0.384982	0.108677	0.103880	0.163927	0.021573	-0.041232	0.882720	0.333868	0.351130	-0.001095

FQ3	0.154318	0.226205	0.223814	0.070923	0.042752	0.024720	-0.086908	0.795564	0.255626	0.350001	-0.107265
GQ1	0.332978	-0.090817	0.229505	0.509702	-0.007887	0.354564	0.431071	-0.129589	0.021154	0.005736	0.918200
GQ2	0.373807	-0.045516	0.306275	0.536942	0.022907	0.409765	0.481573	-0.075428	0.077514	-0.035048	0.929568
GQ3	0.453778	0.062326	0.402571	0.437860	0.178882	0.296804	0.310538	0.089291	0.144407	0.119667	0.846218
HQ1	0.234691	0.396407	0.046388	0.230854	0.373294	0.189055	0.042786	0.358023	0.224947	0.841921	0.080176
HQ2	0.206546	0.232413	0.068852	0.084385	0.330876	0.107293	-0.045251	0.347382	0.237285	0.875526	0.009743
HQ3	0.230694	0.105940	0.114970	0.160966	0.262825	0.099789	-0.033944	0.233330	0.141217	0.797204	-0.007203
IQ1	0.250043	0.397943	0.244341	0.073789	0.266311	0.111044	0.130508	0.305020	0.921940	0.246653	0.137796
IQ2	0.018274	0.237542	0.151364	0.119243	0.116553	0.068455	-0.031079	0.433495	0.798560	0.160449	-0.007972
JQ1	0.489809	0.020729	0.826322	0.194480	0.030129	0.028105	0.128994	0.112152	0.199599	0.023565	0.304325
JQ2	0.379096	0.044419	0.820150	0.246173	0.042677	0.051232	0.126628	0.233372	0.133313	0.077798	0.308568
JQ3	0.338060	0.019563	0.743787	0.189013	0.022125	-0.040192	0.085255	0.055434	0.180411	0.005131	0.235804
JQ4	0.468938	0.100075	0.886977	0.231206	0.054703	0.072150	0.156837	0.211639	0.215308	0.112332	0.355000
JQ5	0.519578	0.132405	0.830610	0.277160	0.043269	0.147903	0.204668	0.206951	0.235093	0.112460	0.240752
KQ1	0.383094	-0.056462	0.255595	0.868039	0.096035	0.524821	0.435253	0.110789	0.161106	0.186256	0.519786
KQ2	0.318586	-0.112562	0.264615	0.814148	0.063061	0.381168	0.290492	0.150872	0.105999	0.170777	0.493735
KQ3	0.435843	-0.082111	0.255322	0.822491	0.092701	0.416632	0.389660	0.093542	0.006345	0.183089	0.397857
KQ4	0.372441	-0.065432	0.182581	0.840266	0.072923	0.323911	0.348498	0.026040	-0.009253	0.067249	0.455090
KQ5	0.467104	0.045014	0.258528	0.844910	0.156363	0.411075	0.363324	0.226839	0.156169	0.199005	0.499386
KQ6	0.365500	0.002349	0.220646	0.821206	0.196679	0.354761	0.286124	0.229452	0.053745	0.275349	0.392644
KQ7	0.392141	-0.114118	0.202718	0.828415	0.020337	0.414627	0.390917	-0.034211	0.002304	0.097205	0.497073
KQ8	0.384064	-0.024966	0.225901	0.858848	0.088506	0.419973	0.414272	0.144746	0.191396	0.079314	0.427141

The factor load of a question associated with a variable must be at least 0.1 times greater than the time it is connected to other variables; typically, it should be at least 0.1 greater than the numbers in the same row.

5.4. Fornell-Larcker Test

This test has a lower validity compared to the previous test; however, it examines all the components so that the two sets do not converge. Indeed, this test is a complement to the earlier one.

It changes a correlation table so that the 1s on the primary diameter is replaced by the AVE root.

Table 5 . Fornell-Larcker Table

	process	System	Optimization	Performance	Providing	Integration	Improve	risk	indirect	Direct
Process	0.823002									
System	0.074278	0.849838								
Optimization	0.544508	0.085127	0.822838							
Performance	0.469117	-0.056402	0.279867	0.837482						
Collect	0.135147	0.512421	0.048450	0.120268						
Providing	0.200136	0.088087	0.075360	0.488164	0.897563					
Integration	0.250691	0.099709	0.178030	0.438289	0.820057	0.843360				
Improve	0.155396	0.330226	0.208067	0.146113	0.021802	-0.055215	0.823192			
Risk	0.182337	0.383616	0.238014	0.104834	0.108018	0.076966	0.406720	0.862459		
Indirect	0.266298	0.303733	0.088165	0.190359	0.160465	-0.011795	0.378410	0.243696	0.838831	
Direct	0.433570	-0.024790	0.351721	0.550223	0.392882	0.451898	-0.039045	0.092398	0.036225	0.898754

Now, the AVE root of each variable must be higher than all the correlation coefficients of that variable with the other variables.

The total conditions of convergent and divergent validity indicate the structure validity in the model.

5.5. Quality Test of the Reflective Measurement Model

The quality of the reflective measurement model means that the questions of each variable can correctly measure their correspondent variables in a measuring model. The method of quality measuring of the reflective measurement model is performed through a special test called communal cross-validity. Cross validity and communality or CV com index, similar to the studies of Brin (2016) and Hensler (2014), were compared using three numbers.

Table 6. The quality standard of the reflective measurement model

Weak	Medium	Strong
0.02	0.15	0.35

If the quality of the measurement model is less than 0.02, the model should be revised and the questionnaire should be redesigned.

Table 7. CV com index

	1-SSE/SSO
Collect	0.681946
Direct	0.778032
Improve	0.686710
Integration	0.682445
Optimization	0.677065
Performance	0.701401
Providing	0.719025
System	0.710384
indirect	0.579722
process	0.665471
risk	0.740499

All coefficients for all variables are higher than the strong level; thus, the measurement model has good quality. However, this is not adequate for a model, and at the end of the task, the overall model must have good quality.

5.6. Internal (Structural) Model

The SEM of our research according to its path coefficients and the significance of these coefficients are as follows:

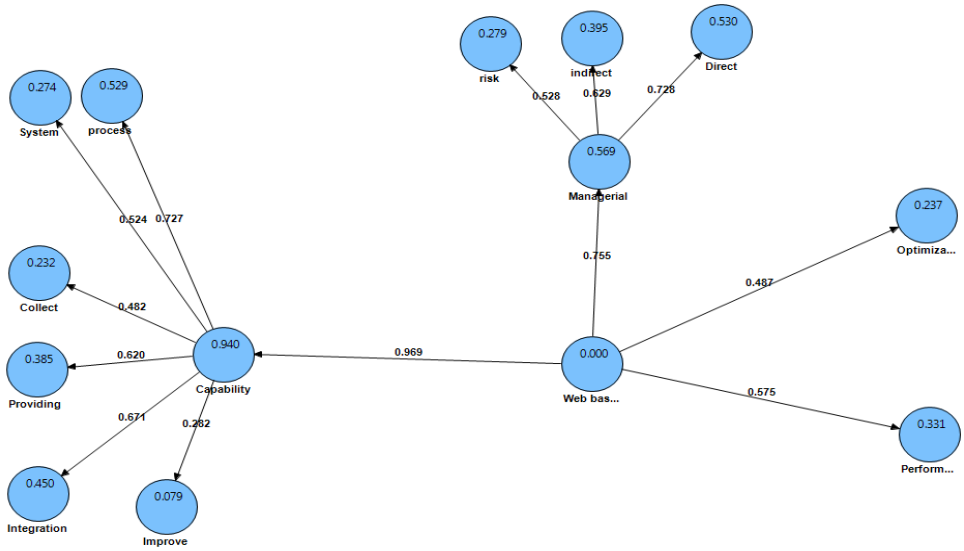

Figure 4. Structural model in the estimate of path coefficients

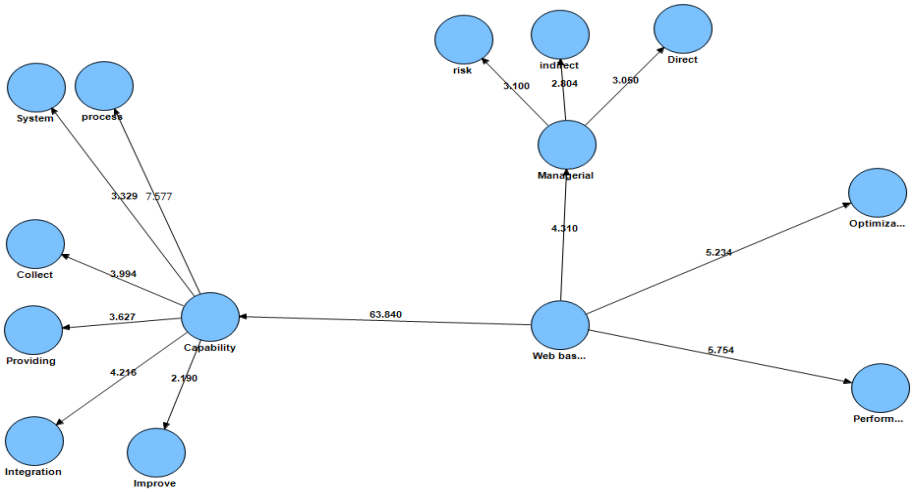

Figure 5. Structural model in the estimate status of the path coefficients' significance

5.7. Significance Test of Hypotheses (Significance of Path Coefficients)

Based on this test, it is investigated whether the β coefficients of each hypothesis are statistically significant.

Table 8. Path coefficients of the structural model

	Optimization	Performance
Web-based	0.486688	0.575304

Table 9. T-value of the structural model

	Optimization	Performance
Web-based	5.234257	5.753740

Table 10. hypotheses

Hypothesis	hypotheses	path coefficients	T-VALUE	Prediction results
first	Web-based analyses have a meaningful impact on digital marketing optimization	0.487	5.234	99% significant
second	Web-based analyses have a meaningful impact on Digital marketing performance	0.575	5.754	99% significant

Now, it should be investigated whether the quality of these predictions is high, moderate, or low.

Chen (1998) stated that R2 is the most critical indicator of a causal model, which specifies the extent that independent variables predict dependent variable behavior. Also, it defines the scope of the dependent variable variance it describes.

Table 11. Standard values of R2

weak	medium	strong
0.19	0.33	0.67

Table 12. R2 dependent variables

	R2
Optimization	0.236865
Performance	0.330975

As shown in Table 12, R2 is the variable of digital marketing optimization between the weak and medium as well as the variable of digital marketing performance between medium and strong.

5.7.1. Cross validity: CV red

The cross-validity examines the model quality that is also known as the commonality index. This index is only reported for endogenous variables because it means that whether the behavior prediction of the endogenous variables by exogenous ones has a good quality or not.

Table 13. Standard values CV red

weak	moderate	strong
2%	15%	35%

Table 14: CV red values

	1-SSE/SSO
Optimization	0.153853
Performance	0.229424

Considering the CV red coefficients, it is concluded that the efficiency of SEM in predicting the behavior of digital marketing optimization is at the medium to a strong level. However, regarding the variable of digital marketing performance, it is between medium and strong. Given the coefficients of CV com, in the measurement model, the quality of the measurement became strong. However, the CV red indices almost show a moderate quality of the SEM.

5.8. Discussion and Conclusion

Studying the impact of web-based analyses on optimization and performance of digital marketing revealed that the first research hypothesis on the effect of web-based analyses on digital marketing optimization was accepted with a

confidence level of 95%, path coefficient of 0.487, and t-value of 5.234. Therefore, web-based analysis has a significant impact on digital marketing optimization.

The second research hypothesis on the effect of web-based analyses on digital marketing performance was accepted with a confidence level of 95%, path coefficient of 0.575, and t-value of 5.754. Therefore, it is concluded that web-based analyses show a statistically significant effect on the performance of digital marketing. This result is consistent with the findings of Farhadi et al. (2018), Mohammadi and et al. (2018), Hasanpour (2012), and Bashir et al. (2018). To sum up, given the results of the present research, the following practical proposals are provided:

To gain a profound insight using their data and making value-based decisions based on them, marketing managers and experts of web-based companies in Tehran should enhance firm capabilities in several functional areas that lead to improving the capabilities of the website. For this purpose, they can improve the compatibilities in some aspects such as providing predefined exact reports and facilitating web use.

Also, they are recommended following the standards of the World Wide Web Consortium. Eventually, the marketing managers and experts of web-based businesses in Tehran are recommended to create some features in their websites such that to respond automatically to an event, send reports and alerts, as well as having workflow management capabilities. Further, the use of the information exchange capabilities with external systems to contact customers, suppliers, business partners, and employees are among the benefits that the company must exploit by creating value and competitive advantage effectively.

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