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Effect of Gender and Regions on Determinants of Digital Transformation Adoption in Creative Services

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Abstract

The area of digital transformation is attracting considerable interest due to the current trend of digital transformation being deployed around industries in the world. Many researchers have addressed the issue of technology acceptance in various industries; however, the area of digital transformation along with the demographic characteristics of creative services has not been explored, especially in the context of Vietnam. This study aims to clarify the influence on the determinants of adoption of digital transformation based on gender and region and is the first experiment to survey in creative services in Vietnam. The methodology is primarily derived from the technology, organization, and environment framework, and uses analysis of variance, independent sample t-test, and multivariate linear regression for investigation; further details on the adopted methodology can be found in this paper. The results reported here provide further evidence for the value of gender and region in the decision of digital transformation adoption and their impact on the determinants of digital transformation. This work has presented a background method for the investigation of creative companies in the context of creative services in Vietnam. However, the findings might be only representative of the characteristics of selected demographics and creative services in Vietnam, so additional studies are needed on other demographic factors and areas.

Keywords: D*igital transformation, creative industries, creative companies, TOE framework, analysis of variance, independent sample t-test, and multivariate linear regression.*

1. Introduction

The creative economy is not only the vital role for the national economy, but also other industries in Vietnam, it can contribute to growth, prosperity, and provide many employment opportunities. According to the Creative Industries Classification (UNCTAD, 2008), creative services are considered as a subsector in creative industries. Creativity and innovation are a key source for the knowledge economy, the foundation for modern technology change, the competitive edge in creative companies, and the domestic economy. Especially in the context of globalization, Vietnam is being evaluated for many opportunities for the development of the creative economy due to its geographical location, economy, and culture; furthermore, the benefit of enlargement is not needed to exploit natural resources and invest so much in transportation infrastructure, while the information communication technology (ICT) infrastructure is appropriate for evolution. However, to refer to the growth of creative industries in general and in specific to creative services, the most essential factor is the digital transformation in creative companies according to the current trend of the industry 4.0 era. The useful advantages of digital transformation can certainly be demonstrated as the integration of digital technology in business, the improvement of the business model, the enhancement of operation efficiency, and the approach of more potential consumers. In fact, most empirical studies applied technology acceptance theory (Davis, 1989; Tornatzky and Fleischer, 1990) and demographic characteristics for investigation. For example, Ritz et al. (2019) provided a detailed analysis of the adoption of digital marketing at the management level in small businesses, and Al Hadwer et al. (2021) studied the adoption of cloud-based technologies. Porter and Donthu (2006) investigated the perspective of internet use based on factors such as education, age, race, and income. Similar to the study by Palakurthi (2011), the research also explored the use of radio frequency identification derived from gender, income, and education level. From the issues analyzed, it can be seen that the growth of the creative economy must start from the inner development of each creative firm in Vietnam. To do this, however, they have to apply new science and technology to innovate businesses. Therefore, this article provides evidence of the adoption of digital transformation related to creative services by conducting an empirical study in the context of creative services in Vietnam. In addition, this study also provides key information on creative companies based on factors that affect their digital transformation. The next section considers the theoretical background and research hypotheses; Section 3 presents the methodology and Section 4 discusses the results; the last section concludes the study.

2. Theoretical background and research hypotheses

2.1. Theoretical background

The importance of development in creative industries is now recognized, in which it contributes to developing the economy and enriching the country. Moreover, creative industries create the coherence between countries through many cooperation programs to expand creative products and services not only domestic but also international. More especially, creative services are one of the creative industries according to the classification of the United Nations Conference on Trade and Development (UNCTAD, 2008), and they also play an equally significant role in contributing to the overall growth of the nation. To achieve success, however, each company must take opportunities and apply modern technology from the fourth industrial revolution, especially digital technology, depending on its business environment; thus, digital transformation is a core strategic issue for the company, especially creative companies in creative services. The most realized benefits of digital transformation help businesses reduce operational costs, increase employee productivity, reach more clients, and improve organizational competitiveness.

In fact, many practical studies conducted in various industries, their character being the application of relevant technology adoption theories for exploration, such as the technology acceptance model (TAM) of (Davis, 1989), the technology, organization, and environment (TOE) framework of (Tornatzky and Fleischer, 1990), and especially the role of demographic variables for technology acceptance. Among empirical investigations according to the research area, the typical study by Akman and Rehan (2016) provided the most in-depth analysis of the determinants of the adoption of mobile commerce and services in the workforce, and the findings showed that perspectives are affected by experience, gender, and organizations classified into the public and private sectors. Al Hadwer et al. (2021) used the TOE framework for their study according to cloud-based technology adoption; the study results revealed that organizational perspectives are affected by crucial elements, including cloud complexity, competitive pressure, support of top management, and relative advantage. However, Ritz et al. (2019) conversely proved that the advantages of technology do not have to be a priority factor for the decision on the adoption of digital marketing at the management level in small businesses. In their widely acclaimed work, Ullah et al. (2021) considered threats to the sustainable management of smart cities, the TOE framework helped them identify risks consisting of management of public Internet, user safety, internet of things networks, security of user data, cloud management, surroundings of smart city, as well as its management and security.

An interesting study by Liu and Guo (2017), particularly investigating male and female college students on the adoption of mobile computing devices based on the TAM model, the analysis indicated that the acceptance of male students was only derived from the benefits of social and perceived usefulness while female students included five factors such as benefits of social, perceived usefulness, perceived ease of use, trust and perceived financial cost. Similarly, Naqvi et al. (2019) also organized a realistic exploration between demographic factors and the TAM model; The study results showed that there is a particular relationship between not only perceived usefulness but also demographic characteristics in the plan for using social networking sites. On the contrary, the study by Chen et al. (2002) proved that perceived usefulness did not impact the behavior intention of the online consumer in their research. Furthermore, an analysis by Porter and Donthu (2006) found that demographic characteristics, such as education, age, race, and income, have a significant effect on the consumer's perspective of using the Internet through the empirical study of attitude-based determinants of Internet use. A recent study by Chatterjee et al. (2021) combined the TOE framework and the TAM model to investigate artificial intelligence adoption in enterprises of production and manufacture, they found that factors including the readiness of the organization, compatibility of the organization, partner support for perceived use are not an insignificant effect on firms.

In addition, there are also many other studies in line with demographic attributes. An interesting example is the perception of customers about the features of a fashion website; the findings highlighted demographic variables including income, occupation, age, education, gender, and marital status, which had an essential effect on the attitudes and intentions of customers related to the characteristics of a fashion website such as communication, community, connection, content, customization, and commerce (Kwon et al., 2007). However, the results of Aluri and Palakurthi (2011) differ from those obtained by Kwon et al. (2007), in which gender, income, and education level did not influence the consumer perspective for using radio frequency identification in the hotel industry, except for age. Especially, Harris et al. (2016) studied the wishes of clients about banking technologies among age groups and found modern technologies which are interested in all ages, but younger consumers are more excited. Furthermore, Ramírez-Correa et al. (2019) recognized that the technology readiness index dimension and online shopping have a relationship with gender and generation. Chawla and Joshi (2020) provided a detailed analysis of the adoption of mobile wallets established by age and gender; as a result, younger clients and male users have more effect on other ages and female users on perceptions of mobile wallet adoption.

Despite interest in theories of technology acceptance and demographic characteristics, no studies have considered demographic variables, such as gender and region, which are related to the adoption of digital transformation in the context of creative service areas in Vietnam. Having a practical study in this area will be appropriate for the current trend of digital transformation of many industries in Vietnam; As a result, the results of the study advance to enrich research areas, as well as to recognize the actual impact on the adoption of digital transformation by companies in the creative service field.

2.2. Research hypotheses

This study extends the research of Trieu and Pavelková (2020), so an empirical study was conducted in companies operating in Vietnam's creative services based on their theoretical research framework in the creative industries.

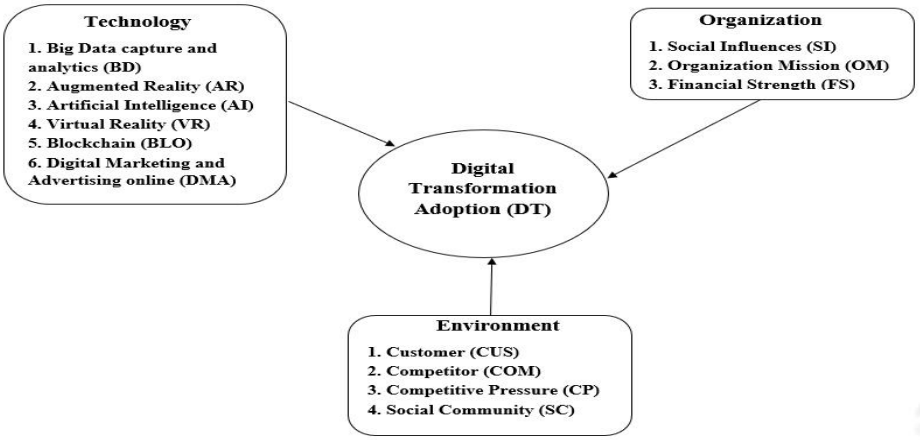

Figure 1: Proposed Research Model
Source: Own study and Trieu and Pavelková (2020)

From the above analysis of the literature review, furthermore, this research combines the research model (Trieu and Pavelková, 2020) to propose the research model (Fig. 1) and research hypotheses as follows:

H1: There is a statistically significant difference in gender for the adoption of digital transformation.

H2: There is a statistically significant difference in regions for the adoption of digital transformation.

3. Methodology

The main survey questionnaire was designed and sent to the management level of creative companies in Vietnam's creative industries for data collection, and the survey had been in place for ten months and was completed in July 2021. Especially, UNCTAD (2008) classifies creative services, which are one of the creative industries including design, creative services, new media, audiovisuals, performing arts, traditional cultural expressions, culture sites, visual arts, publishing, and printed media; thus, the collected data for creative services were also in the main investigation.

As a result, the creative services had 164 respondents out of 674 responses in the creative industries. As highlighted in Table 1, most of the respondents were from Ho Chi Minh City and Hanoi City, which are the two largest cities in Vietnam, and have an educational level of 75.0 % for bachelors and 20.1% for masters; similarly, the male response reached 75.6% compared to females. The survey was also expanded for many job titles, in which two titles had the highest response, such as middle management at 28.7% and owner at 20.1%.

1. Gender		**2. Location of companies**		**3. Educational qualifications**	
Male	124 (75.6%)	Hanoi city	43 (26.2%)	Highschool diploma	8 (4.9%)
Female	40 (24.4%)	Ho Chi Minh city	102 (62.2%)	Bachelor's degree	123 (75.0%)
		Others	19 (11.6%)	Master's degree	33 (20.1%)
4. Company size (people)			5. Job titles		
1-50		62 (37.8%)	Owner		33 (20.1%)
51-100		58 (35.4%)	Chief executive officer (CEO)		22 (13.4%)
101-500		25 (15.2%)	Chief financial officer (CFO)		8 (4.9%)
501-1000		11 (6.7%)	Chief technology officer (CTO)		19 (11.6%)
1001 and 5000		4 (2.4%)	Chief digital officer (CDO)		8 (4.9%)
5001 and more		4 (2.4%)	Chief information officer (CIO)		13 (7.9%)
			Middle managers		47 (28.7%)
			Others		14 (8.5%)

Table 1: Demographics of the respondents
Source: Own study

Furthermore, this study also uses the multivariate regression model based on the proposed research model (Fig. 1) to examine the effect of gender and region on the determinants of the adoption of digital transformation in creative services as follows:

$$DT = \alpha0 + \alpha1*BD + \alpha2*AR + \alpha3*AI + \alpha4*VR + \alpha5*BLO + \alpha6*DMA + \alpha7*SI + \alpha8*OM + \alpha9*FS + \alpha10*CUS + \alpha11*COM + \alpha12*CP + \alpha13*SC + \varepsilon. \quad (1)$$

The measurement of dependent variable (DT) and predictor variables (AR, AI, VR, BLO, DMA, SI, OM, FS, CUS, COM, CP, and SC) was determined in previous studies (Tripopsakul, 2018; Chandra and Kumar, 2018; Venkatesh et al., 2003; Karatepe and Aga, 2016; Mckinnie, 2016; Hwang et al., 2016). Data analysis using the Statistical Package for Social Sciences (SPSS) version 25 with examination procedures comprises the following steps, such as independent sample t-test, analysis of variance, Cronbach's alpha, exploratory factor analysis, Pearson's test, and multivariate regression analysis.

4. Results and Discussion

4.1. Independent sample t-test

In Table 2, it can be observed that the p-value of Levene's test was greater than 5% and the p-value (2-tailed) in the part of

the assumed equal variances was not less than 5% as well. Therefore, the null hypothesis is accepted, so the hypothesis (H1) is rejected. In other words, there is no statistically significant difference in gender groups for the adoption of digital transformation in Vietnam's creative services.

	Levene's test		T-test for Equality of Means			
	F	P-value	t	df	P-value (2-tailed)	Mean Difference
Equal Variances assumed	1.699	0.194	-0.023	162	0.981	-0.0046
Equal Variances not assumed			-0.029	101.535	0.977	-0.0046
Notes: Significance is statistical at 10% (*), 5% (**), 1% (***)						

Table 2: Independent sample test of the adoption of digital transformation based on gender Source: Own study

4.2. Analysis of variance

Table 3 summarizes the results of the one-way ANOVA test. Because the Levene test was not significant at 5%, the analysis of variance was used in the next step. As a result, the p-value of the variance analysis was greater than 5%, which means that there is no statistically significant difference in the adoption of digital transformation between the region groups in the creative services of Vietnam and the hypothesis (H2) is eliminated.

Part A: Test of homogeneity of variances				
	Levene statistic	df1	df2	P-value
Based on Mean	0.066	2	161	0.936
Part B: Result of Variance Analysis				
	Sum of Squares	df	Mean Square	P-value
Between Groups	0.621	2	0.31	0.77
Within Groups	193.52	161	1.20	
Total	194.14			
Notes: Significance is statistical at 10% (*), 5% (**), 1% (***)				

Table 3: One-way ANOVA test of the adoption of digital transformation based on region Source: Own study

4.3. Reliability test

The results of Cronbach's alpha analysis showed that three of the 14 variables were not reliable because their Cronbach alpha coefficients were less than 0.7 (Hair et al., 2010). Thus, these variables, such as BLO, FS, and SC, were rejected from equation (1).

4.4. Exploratory Factor Analysis

After completing Cronbach's alpha analysis, the next step is exploratory factor analysis using the method of principal components with varimax rotation. Interestingly, ten factors of independent variables were extracted in Table 4, and most factor loadings were greater than 0.5.

Dependent variable										
Observed variables			DT2		DT4		DT3		DT1	
Factor loadings			.898		.892		.871		.835	
Observed variables	Independent variables - Factor loadings									
	1	2	3	4	5	6	7	8	9	10
CP2	.866									
CP3	.786									
CP1	.731									
CP4	.704									
SI2		.841								
SI1		.803								
SI3		.637								
SI4		.605								
AR1			.845							
AR2			.823							
AR3			.818							
OM2				.799						
OM1				.777						
OM3				.766						
AI2					.836					
AI3					.830					
AI1					.794					
CUS3						.820				

CUS1						.782				
CUS2						.765				
COM1							.870			
COM2							.840			
COM3							.758			
DMA2								.832		
DMA3								.795		
DMA1								.779		
VR1									.818	
VR2									.768	
VR3									.705	
BD2										.808
BD3										.776
BD1										.689

Table 4: Results of exploratory factor analysis
Source: Own study

Furthermore, other values of the dependent variable (KMO = 0.838, Chi-square = 390.21, df = 6, p-value = 0.000, eigenvalues = 3.058, cumulate = 76.43%) and predictor variables (KMO = 0.846, Chi-square = 3389.62, df = 496, p-value = 0.000, eigenvalues = 1.008, cumulate = 78.48%) were also relevant, in which the p-value was significant at 5%, KMO values were not less than 0.5 and eigenvalues were larger than 1; therefore, all values are appropriate for the study of Hair et al. (2010).

4.5. Pearson test

According to a study by Schober et al. (2018), the 95% confidence interval is between 0.03 and 0.7, so the correlation coefficient is greater than or equal to 0.7, which happens to be a strong correlation between variables.

	BD	**AR**	**AI**	**VR**	**DMA**	**SI**	**OM**	**CUS**	**COM**	**CP**	**DT**
BD	1										
AR	.34**	1									
AI	.45**	.30**	1								
VR	.40**	.48**	.26**	1							
DMA	.43**	.43**	.29**	.51**	1						
SI	.42**	.32**	.48**	.38**	.47**	1					
OM	.35**	.26**	.36**	.26**	.30**	.32**	1				
CUS	.33**	.26**	.38**	.27**	.29**	.39**	.59**	1			
COM	.21**	.30**	.36**	.28**	.24**	.23**	.35**	.43**	1		
CP	.41**	.27**	.31**	.34**	.36**	.44**	.38**	.41**	.19**	1	
DT	.49**	.34**	.61**	.38**	.36**	.45**	.60**	.58**	.52**	.36**	1
Notes: The correlation is significant at 1% (**)											

Table 5: Pearson test for dependent and independent variables
Source: Own study

As can be seen in Table 5, each pair of variables was significant at 5%, and the correlation coefficients were also less than 0.7, which means that a multicollinearity phenomenon does not occur.

4.6. Multivariate regression analysis

In Table 6, the results of the complete sample test showed a positively significant relationship between the four variables (BD, AI, OM, and CUS) and DT, but a significant difference was found between the genders, in which three variables (AI, OM, and COM) affected DT in men compared to women with only one variable (CUS).

Dependent variable (DT)	**Full Sample (Obs. = 164)**		**Male (Obs. = 124)**		**Female (Obs. = 40)**	
	SC	P-value	SC	P-value	SC	P-value
Const. (α0)		0.16		0.014**		0.291
BD (α1)	0.147	0.017**	0.064	0.310	0.187	0.276
AR (α2)	-0.015	0.789	0.046	0.441	-0.295	0.136
AI (α3)	0.289	0.00***	0.342	0.00***	0.184	0.437
VR (α4)	0.074	0.226	0.084	0.177	0.041	0.824
DMA (α5)	-0.003	0.967	-0.051	0.428	0.047	0.789
SI (α6)	0.037	0.552	0.102	0.104	-0.286	0.203
OM (α7)	0.235	0.00***	0.306	0.00***	0.009	0.963
CUS (α8)	0.202	0.00***	0.121	0.063*	0.585	0.00***
COM (α9)	0.221	0.000	0.209	0.00***	0.100	0.570
CP (α10)	-0.045	0.445	-0.017	0.762	0.039	0.862

R square	0.65	0.752	0.396
P-value	0.000***	0.000***	0.086*
Notes: Significance is statistical at 10% (*), 5% (**), and 1% (***). Const.: Constant. SC: Standardized coefficients. Obs.: Observation.			

Table 6: Regression results for determinants of digital transformation adoption based on gender
Source: Own study

Similarly, both Hanoi City and Ho Chi Minh City were the three variables that influenced DT in Table 7, in which Hanoi City included AI, CUS, and COM, while Ho Chi Minh City was AI, OM, and COM. In particular, no evidence of impact was found in other places.

Dependent variable (DT)	**Full Sample (Obs. = 164)**		**Hanoi City (Obs. = 43)**		**Ho Chi Minh City (Obs. = 102)**		**Others (Obs. = 19)**	
	SC	**P-value**	**SC**	**P-value**	**SC**	**P-value**	**SC**	**P-value**
Const. (α0)		0.16		0.422		0.153		0.346
BD (α1)	0.147	0.017**	0.061	0.727	0.134	0.090	-0.048	0.821
AR (α2)	-0.015	0.789	0.038	0.762	0.020	0.788	-0.759	0.073
AI (α3)	0.289	0.00***	0.296	0.02**	0.300	0.00***	0.156	0.601
VR (α4)	0.074	0.226	-0.103	0.444	0.113	0.177	0.090	0.647
DMA (α5)	-0.003	0.967	0.083	0.434	-0.108	0.248	0.557	0.195
SI (α6)	0.037	0.552	0.008	0.949	0.119	0.135	-0.256	0.505
OM (α7)	0.235	0.00***	-0.053	0.718	0.389	0.00***	-0.239	0.268
CUS (α8)	0.202	0.00***	0.482	0.00***	0.126	0.113	0.346	0.328
COM (α9)	0.221	0.000	0.292	0.021**	0.162	0.024**	0.438	0.154
CP (α10)	-0.045	0.445	0.079	0.440	-0.060	0.428	0.568	0.252
R square	0.65		0.79		0.64		0.88	
P-value	0.000***		0.000***		0.000***		0.009***	
Notes: Significance is statistical at 10% (*), 5% (**), and 1% (***). Const.: Constant. SC: Standardized coefficients. Obs.: Observation.								

Table 7: Regression results for determinants of digital transformation adoption based on region
Source: Own study

Interestingly, the results revealed that there is no statistically significant difference in factors, including gender and region, for the adoption of digital transformation in Vietnamese creative services. However, the gender findings differed considerably from those reported in previous studies (Kwon et al., 2007; Akman and Rehan, 2016; Ramírez-Correa et al., 2019; Chawla and Joshi, 2020), but are in line with Aluri and Palakurthi (2011). Furthermore, the most interesting regression equation was established from the research framework that removed three variables due to their unreliability, such as blockchain (BLO), financial strength (FS), and social community (SC). The most striking observation that emerged from the analysis was the effect of gender and region on the determinants of the adoption of digital transformation in the context of Vietnamese creative services. The results of the factors (BD, AI, VR, AR, and DMA) were first found, but other factors (SI, OM, CUS, COM, and CP) were also explored in gender and region groups. Variables, such as customers in the female and Hanoi city groups and competitors in the male and Ho Chi Minh city groups, which were significant at 5%, are consistent with the study by Tripopsakul (2018); however, the variable of social influence had a converse result in all groups. Similar to the work of Karatepe and Aga (2016), positively significant results of the organizational mission variable were detected, which are in male and Ho Chi Minh city groups. Especially, this study shows that the result of competitive pressure was not significant in all groups, which is appropriate for the study by McKinnie (2016). Nevertheless, these different results can only be partially explained in this study due to the limitation of an unequal sample size between the groups.

5. Conclusions

In summary, these results emphasized the importance of gender and region for the adoption of digital transformation, as well as the effect of them on the determinants of digital transformation in the creative services belonging to Vietnam's creative industries. The results reported here confirm that there are no differences between gender and region associated with the adoption of digital transformation. However, the findings, which were from multivariate regression analysis, revealed that there are not many factors that affect the adoption of digital transformation. For example, only four of the ten factors in the entire sample, including big data capture and analytics (BD), artificial intelligence (AI), organizational mission (OM), and customer (CUS), impacted the adoption of digital transformation compared to the results of other separate groups. This study has underlined the significance of gender and region in the context of the research area and contributes to enriching the issues of digital transformation in Vietnam's creative services, especially the creative enterprises operating in this industry. Furthermore, this work can be helpful at the management level, recognize and focus on other factors that can influence the progress of digital transformation of creative companies, such as augmented reality (AR), virtual reality (VR), and digital marketing and online advertising (DMA) because these modern technological elements are trendy and have been popularly applied in creative industries in general. Competitive pressure should be more centralized because this factor will have a direct and indirect influence on businesses in the market; therefore, when weaknesses are overcome, they also contribute to promoting the development of creative firms based on investment effectiveness, improving governance capacity, and recognition

of possible risks. The most important limitation is the result of the fact that surveyors are a representation of businesses in creative services, and the sample distribution of research data is not equal between the separate groups, which can also affect the reliability of the study results. Further research is needed to investigate the larger sample size in this area or other areas in the creative industries, as well as consider applying this research framework with other demographic variables for various studies.

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