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Study of Impact of Information Technology On the Organizational Performance of Moroccan Public Higher Education Institutions

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ABSTRACT

The objective of this paper is to study the relationships between the different variables of the research model using simple regression analyses. To this end, the main research question is: To what extent do contingency factors impact organizational performance in Moroccan higher education institutions?

Thus, in order to answer this question, we have mobilized both the literature related to the computerization factor and to organizational performance.

As for the hypothesis test carried out on a sample of 82 observations, i.e. a return rate of 51.25,the results were quite different. In this regard, the results obtained through the questionnaire allowed us to note that the relationship between computerization is explained up to 71.6% knowing that the goodness of fit is accepted (R2 = 51.3%), and, therefore, the computerization factor positively impacts the organizational performance of Moroccan higher education institutions.

Key words: Performance, Contingency, Computerization, Higher education, Morocco.

1. THEORETICAL FRAMEWORK

1.1. Organizational performance

Economists define performance as the product of effectiveness, efficiency and relevance. Effectiveness reflects the ability of the organization to achieve the expected results, i.e. the link between the results obtained and the objectives set ("Have the objectives set been achieved?"). Efficiency is the optimization of the means to achieve a result[1] ("Do the means used allow the results to be achieved?"). Finally, relevance reflects the link between the resources allocated by the organization and the objectives it has set ("Do the resources used correspond to the objectives?").

For Kalika (1988), organizational performance refers to "how well a firm uses its own advantages and reduces shortcomings to ensure the achievement of its goals." Kalika considersfour aspects of organizational effectiveness:

- Respect the formal structure.
- Interdepartmental relations: In some cases, differences between the different goals of all departments in the company can create conflicts. Part of management's responsibility should be to limit and resolve these conflicts through coordination and integration.
- The quality of the information flow.
- Structural flexibility is related to the organization's ability to challenge itself to adapt to environmental changes and even to anticipate environmental changes. It is assessed by thedegree to which major structural changes are achieved.

1.2. Contingency theory

Contrary to classical theory, which seeks to establish norms regardless of the firm, contingencytheorists are one of the last schools of organization theory (1980), seeking solutions that are satisfactory for specific firms in a specific context.

Contingency theory assumes that the survival and performance of an organization depends on the degree of fit between its structural elements and various contingency factors such as environment, technology and strategy. Many contingency theorists consider strategic variables as the primary contingency variables (Mintzberg et al. 1999; Chapman, 1997). They concluded that it has the expected impact on any management control system. In his book published in 1988, Anthony determined the influence of competitive strategy on the configuration of management control systems. He named: *In the leadership strategy, management tries*

to produce at low cost and the control system should emphasize cost control. In the differentiation strategy, the emphasis is on developing products, distribution methods, or any other characteristic perceived as unique in the industry. Thus, the contingent method corresponds to the vision of technical and economic rationality, which takes into account the internal and external characteristics of the company. Thus, the universalist model is replaced by the expression of a management control that can be adjusted according to the type of organization (i.e., according to the characteristics of its environment, strategy, sector, size, technology and other observable contingency factors). Woodward & Perrow found that technology has a strong influence on organizational choices, based on a study of 100 British industrial companies. Mintzberg highlighted four contingency factors: the age and size of the organization, its technical production system, its environment, its power system. Thus, the contingency is at a double level: the general organization is constrained by its own environment, while management control is determined by the type of organization in which it operates. Thus, the management control system and/or subsystems of the organization are more or less directly subject to the same determinants.

1.3 Computerization factor (technology)

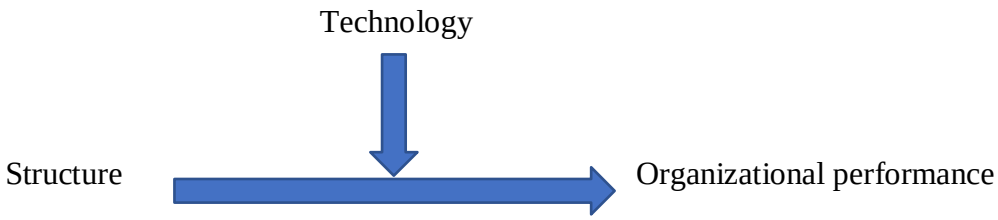
The performance of an organization is largely determined by its technological assets, which require continuous maintenance, significant expenses, qualified people who use them, an executive power that oversees everything, etc. Thus, in order to be able to coordinate and manage all these elements, the organization is forced to develop a structure that is specific to it and applicable to all the environments that surround it. Joan WOODWARD finds that technical contingency remains a necessity for any organization, especially since adaptation is a logical continuation of all that we have just developed on this factorial principle. Moreover, WOODWARD believes that it is an integral part of an organization's success in :

- Coordination between all the elements that make it up.
- Create an appropriate work atmosphere within the organization.
- Actions to face the competition.

1.4. Technological contingency (computerization) and organizational performance

The first area concerns technological contingencies. Two major studies in this area are those of Woodward (1965) and Burns et al. (1961). Woodward's (1965) empirical study first focused on technology to explain the function of organizational structure. The techniques implemented by British firms explain the differences encountered among the firms studied. Woodward (1965) found that technology varies with the mode of production and the complexity of the technological system employed by the organization. The main conclusion from his research is that organizations with similar production systems create similar organizational structures, and that creating structures that fit existing technological systems affects organizational performance. Figure 1 shows the relationship between technology, structure, and organizational performance as proposed in Woodward's (1965) research.

Figure 1Relationship between technology, structure and organizational performance



Source: Adapted from Woodward, J. (1965). Industrial Organization: Theory and Practice. Oxford: Oxford University Press.

2. THE TECHNOLOGICAL CONTINGENCY AND THE PERFORMANCE OF MOROCCAN PUBLIC HIGHER EDUCATION INSTITUTIONS

The irreversible development of information and communication technologies (ICT) has opened new perspectives for Moroccan higher education. The use of these technologies in higher education creates a new learning environment and their impact on knowledge acquisition is multiple. In fact, ICT has significantly changed teaching and learning methods by introducing new resources and methods, and has helped improve communication and develop a more user-friendly environment to facilitate information and knowledge sharing. Moroccan public higher education institutions are convinced of the role that ICT can play in improving the quality of education and training, and many initiatives are being undertaken to strengthen the promotion and integration of ICT in higher education. As part of a well-thought-out national strategy, the Moroccan government has developed several projects.

The mastery of computers by students and their supervisors and administrators is now a foundation of skills that no one can ignore. Thus, instead of detailing the urgency of mastering this tool that has become a necessity and a differentiating element.

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2.1. The challenges of digital use in Moroccan higher education

Pedagogy by effectively using the new possibilities of ICT in education. From MOOCs (Massive Open Online Courses) to serious games, through virtual reality, the possibilities are numerous, not to say unlimited. They are only limited by the development of the technology itself. On the one hand, they make it possible to deal with the problems of democratization and insufficient supervision, and on the other hand, they offer new pedagogical learning techniques centered on the acquisition of skills. However, some initiatives have existing strengths,including those:

- EMI, which has set up a digital campus with distance learning services and a digital library.
- Moroccan Universities have launched the MOOC platform; Initiative Maroc Université Numérique;

This obviously means that students and their supervisors can be adequately equipped. In this regard, it is worth highlighting the existence of the INJAZ program, which is based on an annual basis on services provided by the telecom operator, which includes a student package includinghigh-speed Internet service and lightweight laptops

Institutional, by giving decision-makers the tools to monitor institutions and steer their performance in real time. In a complex and multi-component environment, transparency, good governance, coordination and good decision making present important monitoring and guidance challenges. The implementation of a coherent, clear and unified information system is undoubtedly a real catalyst for reporting metrics to all levels of decision-making, in order to monitor developments "on the ground", to take appropriate decisions, but also for the development of appropriate strategies.

Social and societal aspects, improving student life by providing innovative services to students and teachers while making them aware of the social, economic and strategic issues related to these technologies. This is an immediate ripple effect, as digital technologies must be part of a new socio-economic paradigm for which the field of education, particularly higher education, must be the guarantor. Moreover, while some institutions have the capacity to obtain academic ERPs, others are forced to "do what they can" in order to provide students with applications to access course profiles, for example online. So, the financial aspect is key to getting these institutions to begin their digital transformation.

2.2. Moroccan higher education investment projects in ICT

- **The Digital University Morocco platform**

The Maroc Université Numérique platform dedicated to open and large-scale online courses was officially launched in Morocco on July 12, 2019. Developed in collaboration between the Ministry of National Education and the French public interest grouping "GIP FUN-MOOC", the platform is the first of its kind in Morocco and Africa, and aims to develop private online courses for small groups (SPOC) and promote the development of Moroccan and French universities in cooperation in mutual distance education to adapt to the particularities of Moroccan higher education. The platform offers content in multiple fields: education and training, engineering sciences, computer science, economics and finance, basic sciences, health, languages, management and entrepreneurship, environment, human sciences and law.

- **Partnership agreement between the Ministry of Higher Education, Scientific Research and Innovation and Huawei Technologies Morocco**

Aware of the strategic importance of the integration of digital technologies in academic and scientific fields and the need to strengthen and diversify cooperation and partnership programs, especially with the private sector, Abdellatif Miraoui, Minister of Higher Education Scientific Research and Innovation and Jerry Cui, Director The Director of Huawei Technologies Morocco, signed a cooperation agreement between the Ministry of Higher Education, Scientific Research and Innovation and Huawei Technologies Morocco on Monday, December 6, 2021 in Casablanca.

The pact aims to lay the foundations for innovative partnerships in technology and digital technology, with a view to facilitating the professional integration of students in:

- By 2025, 70 Huawei ICT academies will be established;
- Develop training and certification programs open to students, teachers and administrativeand technical supervisors;
- An award of excellence for the best students in networks and telecommunications;
- Supporting students to participate in international digital-related competitions; Organizing seminars and workshops to exchange expertise and experience.

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3. METHODOLOGY

The method followed is based on the exploitation of data obtained from a questionnaire (see Table 1) distributed to 160 public higher education institutions (Morocco). We have therefore chosen "presidents, deans, directors, and general secretaries" as the main actors in this evaluation. It should be noted that, as Lacroix pointed out in 2011, for these types of studies, the choice of managers as the means of evaluation makes it possible to obtain reliable results. In addition, the development of the questionnaire took into account the degree of agreement ofthe managers of the characteristic of the performance measurement indicators.
Based on our post positivist epistemological positioning, the design chosen for the study is action research. The objective of our research is to study the impact of

Table 1 List of Moroccan higher education institutions that are the object of ourresearch (Study conducted in 2021)

Type of establishment	2020-2021
Shari'a, Al-Logha Al Arabia and Oussoul Eddine Faculties	4
Faculty of Law, Economics and Social Sciences	15
Faculties of Economics and Management	4
Faculty of Law and Political Science	2
Faculty of Humanities and Social Sciences	13
Faculty of Languages, Arts and Humanities	1
Faculty of Languages, Humanities and Arts	1
Faculty of Humanities and Social Sciences	1
Faculties of Science	12
Polydisciplinary Faculties	13
Faculties of Science and Technology	8
Faculties of Medicine and Pharmacy	7
Faculties of Dentistry	2
Schools of Engineering Sciences	21
National Schools of Business and Management	12
Superior Schools of Technology	15
Faculty of Education	1
King Fahd College of Translation	1
Higher Institute of Health Sciences	1
Ecoles Normales Supérieures and Ecole Normale Supérieure de l'Enseignement Technique	7
Higher Education and Training Schools	5
Sport Science Institutes	2
University Presidencies	12
Total	160

4.RESULTS AND DISCUSSION

4.1. Computerization (Technology)

The position of the institution in relation to rivals with regard to the evaluation of organizational performance according to organizational contingency factors via these five criteria in the following manner: (1: very low, 2: low, 3 Medium, 4: high, 5: very high).

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Table 2 Selected measures of the computerization variable

Computerization (Technology)	1	2	3	4	5
INF1- The website making information about the institution accessible	2	12	11	40	17
INF2- The institution has a digital library for the benefit of learners	8	46	12	13	3
INF3- Updating, sharing and digitizing educational content with learners	3	13	21	36	9
INF4- You have an electronic signature	10	29	9	25	9
INF5- Your establishment uses monitoring and steering tools (validated reference system, management chart, etc.)	6	20	20	27	9

4.2. Organizational performance objectives versus technological contingency

Table 3 Selected measures of the organizational performance variable

Organizational performance objectives	1	2	3	4	5
POI1. Easy access and sharing of information with stakeholders.	10	15	11	37	9
POI2. Development of budget monitoring and planning tools to refine and accelerate performance management.	13	41	10	16	2
POI3. The computerization of administrative procedures simplifies the life of students and institution staff (processing of claims and distance learning ...)	5	23	17	32	5
POI4.Good management of the recruitment process through the improvement of the HR platform.	8	21	19	22	13

4.2. Quality assessment of the variable measurement scales

4.2.1. Assessment of the quality of the measurement scale for the independent variable(computerization)

Assessing the quality of the scale (validity and reliability testing) required many steps before arriving at a valid and reliable scale. Bartlett's test of sphericity and the measure of sampling precision (KMO) conducted on the seven statements of the financial aspect give satisfactory results and guarantee the aptitude of the scale to be factorized. These results prompt us to begin the exploratory factor analysis.

We performed a PCA on all the items of the variable "**Computerization**", the results are as follows:

Table 4 KMO index and Bartlett test

Kaiser-Meyer-Olkin index for measuring sampling quality.		0,705
Bartlett's sphericity test	Chi-square approx.	172,671
	Ddl	10
	Meaning	0,000

The value of Bartlett's sphericity test calculated is statistically significant at the α risk threshold of 5% (the test result is well below 0.05). This allows us to safely reject the hypothesis of simultaneous nullity H_0 (according to which the correlation matrix is an identity matrix) of all the correlation coefficients. It is therefore interesting (and justified) to conduct an exploratory factorial analysis in principal components.

The value of KMO obtained is equal to 0.705, which is poor but sufficient (> 0.5) to perform an exploratory factorial analysis. This value converges with the previous result of Bartlett's test according to which the correlation matrix is statistically different from an identity matrix, justifying the implementation of a factorial analysis.

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Table 5 Total explained variance

Component	Total	of variance	Cumu lative	Total	of variance	Cumulative	Total	of variance	Cumulative
1	2,81	56,321	56,32	2,816	56,321	56,321	2,806	56,127	56,127
2	1,03	20,719	77,03	1,036	20,719	77,039	1,046	20,912	77,039
3	0,586	11,721	88,76						
4	0,400	7,997	96,75						
5	0,162	3,243	100,0						

Extraction method: Principal component analysis.

The factor analysis extracted two components, the first one explains 56.127% of the variance and the second one 20.719%.

Table 6 Reliability statistics

Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of elements
0,760	0,755	5

The Cronbach's alpha score is at a satisfactory level ($\alpha = 0.760$) and shows good internal consistency. The scale alpha is higher than the Cronbach's alpha in case of item deletion, so no item deletion is possible. All five items in our scale contribute to its reliability.

4.2.2. Assessment of the quality of the measurement scale for the dependent variable(organizational performance)

Table 7 KMO Index and Bartlett's test

Kaiser-Meyer-Olkin index for measuring sampling quality.		**0,627**
Bartlett's sphericity test	Chi-square approx.	45,077
	Ddl	6
	Meaning	0,000

The KMO index of 0.627 and the result of the shperity and Bartlett test is significant ($p<0.0005$). We can therefore reject the null hypothesis. The correlations are therefore not all equal to zero. We can therefore continue the analysis.

Table 8 Total Variance Explained

Component	Initial eigenvalues			Sums extracted from the load square		
	Total	of variance	Cumulative	Total	of variance	Cumulative
1	1,936	48,392	48,392	1,936	48,392	48,392
2	0,912	22,792	71,185			
3	0,687	17,175	88,360			
4	0,466	11,640	100,000			

Extraction method: Principal component analysis.

The factor analysis extracted a single component 48.39% of the variance. The rate of variance explained is not acceptable, so item POI4 must be eliminated.

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- **After elimination of POI4**

Table 9 KMO Index and Bartlett's test

Kaiser-Meyer-Olkin index for measuring sampling quality.		**0,637**
Bartlett's sphericity test	Chi-square approx.	35,355
	Ddl	3
	Meaning	0,000

The KMO index of 0.637 and the result of the shperity and Bartlett test is significant ($p<0.0005$). We can therefore reject the null hypothesis. The correlations are therefore not all equal to zero. We can therefore continue the analysis.

Table 10 Total Variance Explained

Component	**Initial eigenvalues**			**Sums extracted from the load square**		
	Total	**of variance**	**mulative**	**Total**	**of variance**	**Cumulative**
1	1,791	60,695	60,695	1,791	59,695	60,695
2	0,695	23,180	83,875			
3	0,514	16,125	100,000			

Extraction method: Principal component analysis.

The factor analysis extracted a single component that explains 60.69% of the variance. Keeping the second column of the table, we see that only one factor or component has an eigenvalue higher than 1. We therefore keep it for the analysis.
However, we want to be sure that we choose the right number of factors to extract. We therefore look at the eigenvalue graph and examine where the break in the cattell curve is located.

Table 11 Reliability statistics

Cronbach's Alpha	**Cronbach's Alpha based on standardized items**	**Number of elements**
0,662	0,661	3

The final table in this analysis is the one containing the value of Cronbach's alpha. We note here that the value of the coefficient is 0.662, which is excellent, for this scale composed of three items, a satisfactory internal consistency.

Table 12 Summary of models[b]

Model	R	R^2	R^2 adjusted	Standard error of the estimate	Edit statistics					Durbin - Watson
					Variation of R- two	Variation of F	ddl1	ddl2	Sig. Variation of F	
1	0,716[a]	0,513	0,507	,55702	0,513	84,260	1	80	0,000	0,973

a. Predictors: (Constant), Computerization

b. Dependent variable: Performance

We find that the adjusted R^2 is equal to 0.513 which means that the steering and governance variable explains 51.3% of the organizational performance. This confirms by interpreting the ANOVA table.

Table 13 ANOVA[a]

Model		Sum of squares	ddl	Medium square	F	Sig.
1	Regression	26,143	1	26,143	84,260	0,000[b]
	of Student	24,821	80	,310		
	Total	50,964	81			

a. Dependent variable: Performance

b. Predictors: (Constant), Computerization

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The analysis of variance (ANOVA) indicates that the Fisher value for model 1 is 84.26. This is significant at p<0.001, which means that we have less than a 0.1% chance of being wrong in asserting that the "Computerization" variable explains organizational performance. We can therefore reject the null hypothesis. It is therefore the independent variable that explains the variation in the dependent variable. In addition, this correlation allows us to determine the nature of the relationship between the variable "Computerization" and the dependent variable "Organizational performance".

Table 14 Coefficients[a]

Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	(Constant)	1,097	,256		4,283	0,000
	Computerization	0,727	,079	,716	9,179	0,000

a. Dependent variable: Performance

Through these analyses, the correlation is well fitted to the observed data so the contingency factor (Computerization) positively impacts the organizational performance of Moroccanacademic institutions.

4.0 CONCLUSION

In this section, we were able to carry out an empirical study in order to confront the theory of contingency with practice. The purpose of this study was to test the hypothesis and our researchmodel.

We began by presenting our research methodology. It should be noted that we have established a positivist research in which we have adopted a quantitative approach according to a hypothetical-deductive reasoning.

We then focused on data collection. This is data collected by the survey method. The questionnaire was developed by reference to the literature review, from which we formulated the questionnaire chained in four parts

We have shown our choice regarding the data collection, it was carried out by the non- probabilistic reasoned choice method as well as by the convenience. Concerning our mode of administration, we used an interview guide as well as the electronic sending via Google Forms. The results obtained were processed and analyzed with two software programs, namely SPSS and SPSS Amos.

REFERENCES

1. BOITIER M. (2002a), L'influence des technologies de l'information et de la communication sur la fonction contrôle de gestion. A socio-technical analysis, Comptabilité, Contrôle, Audit, May2002.
2. BOURGUIGNON A. (1995), " Peut-on définir la performance? ", Revue Française deComptabilité, July-August, pp. 61-66.
3. Edwards D., Thomas Clayton J. (2005). "Developing a Municipal Performance Measurement System: Reflections on the Atlanta Dashboard." Public Administration Review 65 (3): 369- 376.
4. CLAUDE ALAZARD, SABINE SEPARI, " Contrôle de gestion " DECF épreuve n°7, éditionDUNOD 5ème édition.
5. Strategic Plan 2015-2020 "The 2020 Vision Rising to New Challenges", Al Akhawayn University.
6. National Technology Development and transfer System in Morocco, ESCWA, CNRST, 2017. Development project 2014-2018 " Mohammed V University of RABAT ", Saaïd AMZAZI, August 2014.
7. Bencheikh, El Ayachi and Fatima Zahrae Boutachkourt. "Contrôle De Gestion Et Performance Dans Les Organisations Publiques: Une Revue De Littérature." Journal of Control, Accounting and Auditing 5, no. 3 (10/03 2021). Accessed 2021/10/23.
8. Bouamama, Mohamed. "New Challenges of the Performance Measurement System: A Balanced Scorecards Case. New Challenges Of The Performance Measurement System: A Balanced Scorecards Case." University of Bordeaux, 2015. Star U-bordeaux
9. Lusthaus, Charles, Fred Carden, Marie-Hélène Adrien, Gary Anderson, and George Plinio Montalván. Organizational Assessment: A Framework for Improving Performance. 2002.
10. EL MESSAOUDI, Asmaa SAID, Abdelghani BELAKOUIRI, and Sidi Mohamed %J La Revue Marocaine de Contrôle de Gestion RIGAR. "La Contingence Du Contrôle De Gestion. Cas Des Offices Marocains À Caractère Industriel Et Commercial." no. 1 (2018).
11. Louis, D %J Publications Studies and Analyses. "The Theory Of Contingency." (2002)

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