

# THE ROLE OF TECHNOLOGICAL VIGILANCE TO ACHIEVING THE COMPETITIVE ADVANTAGE IN UNIVERSITY EDUCATION AMONG FACULTY MEMBERS AT AL-AQSA UNIVERSITY

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## Abstract

The purpose of this paper is to investigate the impact of technological vigilance on achieving competitive advantage (cost, flexibility, quality) at university education as seen by members of the faculty at Al-Aqsa University. The study population consisted of all faculty members at Al-Aqsa University. A simple random sample with a size of (67) members was adopted. An electronic questionnaire has been distributed. The results of the analysis of the study data indicated that there is a positive effect of technological vigilance on achieving the competitive advantage in university education among faculty members at Al-Aqsa University. Until today little research has been carried out in order to investigate empirically about the relation between technological vigilance and competitive advantage to achieve the quality at high education.

**Keywords:** Technological vigilance; Competitive Advantage;

## 1.0 INTRODUCTION

Recent scientific and technological developments have produced a range of new trends at educational institutions which highlighted a new reality and introduced modern concepts and techniques based on knowledge, information and communication technology.

Therefore, educational institutions and universities have become interested in information as one of the most important resources to adopt in their decisions and design their own strategy, not just depending on material and human resources. Thus, institutions seeking competitiveness are forced to follow technological and scientific developments. In order to keep up with technological developments, the institution must adopt a technology-based system of preventive technology which is like a radar through which signals that suggest changes in the technological environment are captured.

## 2.0 Problem Statement:

In light of the rapid technological developments, the original universities face great challenges in their competitive position in the market within a highly

competitive environment that has emerged with the spread of higher education institutions locally and globally which depend heavily on modern technology in managing its institutions as well as in implementing university education.

Therefore, the only way for the continuous is having the universities their own set of competitive advantages that distinguish them from competitors.

University environments must be studied and their variables identified and how they can be effectively influenced. Thus, universities must be interested in gaining technological vigilance as a system for strengthening their capabilities; to gain a competitive advantage; and, with universities facing challenges in an unstable economic environment. Hence, the research problem can be identified by the following main question:

What impact does technological vigilance have on achieving the competitive advantage in university education in the faculty members of Al-Aqsa University?

### 3.0 Study Hypotheses:

H1: Technological vigilance is positively affecting cost-effectiveness as one of the factors of competitive advantage in university education, as seen by members of the faculty at Al-Aqsa University.

H2: Technological vigilance affects flexibility positively as one of the factors of competitive advantage in university education, as seen by members of the faculty at Al-Aqsa University.

H3: Technological vigilance affects quality positively as one of the factors of competitive advantage in university education, as seen by members of the faculty at Al-Aqsa University.

### 4.0 Study Objectives:

The main objective of this study is recognizing the impact of technological vigilance on achieving competitive advantage (cost, flexibility, quality) at university education as seen by members of the faculty at Al-Aqsa University.

### 5.0 Importance of Study:

The increasing of technological vigilance importance as a system which help of making decisions by observing and analyzing the role of members Faculty of Al-Aqsa University. Besides that, identifying the current and future impacts to discover the opportunities and threats at it.

It also focuses mainly on providing the University with strategic information Enables them to face competition with the best way through depending on scientific standards which linked to the information resources operation as a key of competition to make the university more intelligent and competitive.

### 6.0 Study Limits:

- The procedure the impact of technological vigilance on achieving competitive advantage at university education.
- The study included (67) a faculty member from Al-Aqsa University.
- The study was implemented during the 2019-2020 academic year.
- The study in the Gaza Strip of Palestine was applied at Al-Aqsa University.

### 7.0 Definition of Terms According to The Researcher:

- Technological vigilance: It means the effort of Al-Aqsa University faculty members to collect sufficient information and develop skills needed on modern technologies and its application developments in order to achieve competitive advantage at university education.
- Competitive advantage: It means Al-Aqsa University faculty members seek to achieve excellence in university education with the highest returns while maintaining current advantages and enhancing future competitiveness continuously.

## 8.0 Theoretical Background:

### i. Technological vigilance:

Despite differences between researchers and scientists in providing a single definition of strategic vigilance, but they emphasized that Strategic vigilance provides information to the organization in a scientific and informed manner, which allows it to make decisions of a strategic dimension. The institution's practice of strategic vigilance activity allows it to direct its activities and to create a different vision from internal and external factors, which is primarily focused on the future [1]

Ribault et Martinet [2] points that technological vigilance is the activity to monitor the environment to define the poor signals that emerge during technologies development.

According to Pateyron [3], technological vigilance refers to efforts by the institution and action taken to discover all developments at technique and technology fields for its future as you see in figure 1.

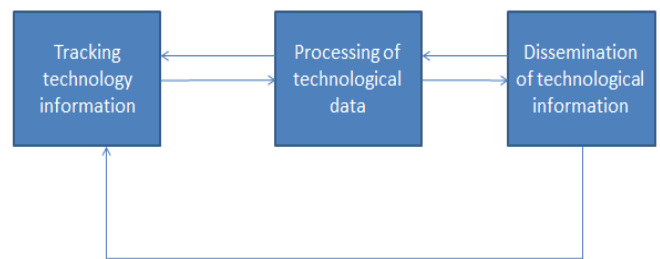


Fig. 1. technological vigilance.

Lesca [4] states strategic vigilance as "the informational process voluntarist by which the company seeks anticipatory information about the evolution of its socio-economic environment with the aim of creating opportunities and reduce risks related to uncertainty". Besides that, the study of Ibn Aouda [5] defines strategic vigilance as an ongoing process in which the environment is monitored and analyzed, information is constantly collected and opportunities identified to seize it and threats to avoid it and reduce its effects.

The study of Alshaer [6] found a positive effect of strategic vigilance on organizational ambidexterity. The study recommends the organizations to employ committees and teams that specialize in strategic vigilance and provide them with all necessary resources to achieve organizational goals. Indeed, the results of the study Dawood & Abbas [7] confirmed the importance of the dimensions of strategic vigilance with operational performance. It also shows that the management of banks monitors their competitors by collecting information on them analyzing the environment of their competitors permanently to raise the quality of their services and

obtain a good market share. Further, the study of [5] indicated that strategic vigilance plays effective role in providing the necessary information in many aspects about its competitors. So, it helps managers to formulate competitive strategies and to monitor their suitability to the environment to achieve very competitive results.

Strategic vigilance includes four types of vigilance which follow on the five forces of the competitive universe according to Porter [8] which are technology vigilance, competitive vigilance, marketing vigilance and environmental vigilance [9].

Erhif & Belmekki [10] points that the technology vigilance activity can be used through the competitive forces Michael Porter model to mobilize the human, technological, material and financial resources and to follow the technological vigilance approach then to implement the technology vigilance structure.

The results of the study Khalifa & Majeed [11] stated that the institution cannot achieve the sustainable competitive advantage because its system based on routine repeated information without the strategic information. Therefore, technological vigilance one of strategic vigilance factors which is a supportive key to improve the quality of decision making through meeting various opportunities.

The article SĂVESCU [12] presents that the technological vigilance helps to increase market competitiveness through a better understanding of the competitive environment and it explains that it limits information overload and determining what is important and its products can support managers in detecting new competitors or those who intend to enter the market. Additionally, it helps the organization to implement policy decisions quickly which made under the pressure and to cope with rapid technological change for survival.

From the above, technological vigilance benefits the organization through following the evolution of its technologies, innovation and investment and identifying competitors at the right time. Also, it enables the organization to collecting and exploiting scientific and technological information in technological innovations.

Besides that, it interests in technological development including scientific discoveries and innovations [13]. By the way, the institution that monitors technologies must build a network of relationships with the technological information sources that it must regularly solicit such as: patents, expert publications, laboratories, technical centers, fairs, schools [14].

## ii. Competitive Advantage:

Recently, the term of competitive advantage has taken the attention of high education institutions that it focuses on the value creation through having a mixture of cost reduction, the advantage of

differentiation and the success strategy. In any particular institution, the five-forces framework emphasized on the importance of innovation and creativity in confronting competition in all fields for Long-term success depending on the type of institutions [8].

In particular, many scholars have engaged into the discussion and research of competitive advantage. They do not conclude into a main definition for competitive advantage. Unfortunately, few researches have been carried out in order to investigate why many managers do not understand the concept of competitive advantage. As it seems, the problem of competitive advantages became more important because of growth of turbulence in business environment [15].

A dictionary of economics by oxford university press defines competitive advantage as advantage an institution has its competitors. There are various sources of competitive advantage like techniques, brand image, consumer loyalty, and location [16].

Hence, Porter [17] defines competitive advantage as one business entity has over its rival entities within its industry. Competitive advantage can be identified through the tools of the value chain model. For instance, Porter's explains that competitive advantage for an institution exists when it is able to deliver the services with a lower cost (cost advantage) and deliver benefits that over exceed those of competing products (differentiation advantage). The strategies of competitive advantages can be through the cost leadership (the low cost), a differentiation strategy and the focus strategy (the target segments) [18].

In more abstract terms, an institution has a competitive advantage when getting profit and growing faster than its competitors do. Simply put, if the economic value created is greater than that of its competitors, the firm has a competitive advantage vice versa [19]. Of course, the problem with the value chain is not so much the idea itself but the fact that in order to put the idea into practice requires looking at a lot of detail and deciding how to apply the idea to specific situations [20]. Therefore, the institution must define its target group, their needs including products, features, and services with the relative price or cost through competing to be the best and unique by creating ideas and new opportunities.

The study of Hosseini, Soltani & Mehdizadeh [21] noted that competitive advantage factors include quality, efficiency, innovation and accountability, with a significant impact on product or service development in order to achieve competitive advantage in the market.

The study of Campos et al. [22] found that technology strategy played a key role for making companies improve their competitive advantage. Therefore, competitive advantage needs to analyzing the technological innovation process through technology strategy by using its sources that

include technology and innovation, human resources and organizational structure to handle the implementation effectively with competitors [23]. Additionally, IT and innovation have positive effect on competitive advantages to obtain great success [24]. Thus, firms should more concentrate on creating resources and capability that can improve innovative strategy to achieved operation performance and success. On other hands, the results of Cámara et al. [25] indicate that a higher use of IT is not directly related with a higher level of competitive advantage in the industry because it depends on some human or managerial resources of an intangible nature.

Moreover, the study of Soliman & Karia [26] confirms that the competitive advantage of the organization is extremely based on its own capabilities, human resources and management practices which can enable firms to achieve the organizational goals.

Indeed, the study of Sigalas [27] suggests that the sources of competitive advantage are the mobility barriers, the market positions (low cost, differentiation or niche market focus), as well as the idiosyncratic firm resources (valuable, rare, inimitable and non-substitutable financial, physical, human, relational resources) and capabilities (competencies derived from a bundle of valuable, rare, inimitable and non-substitutable tangible or intangible resources).

Additional, the findings of the research Mainardes & Ferreira [28] show evidence that, to be competitive, the institution should have a stronger connection between resources, territory, and stakeholders but the top management still does not have a specific definition about competitive advantages and seriously worried by its competitors; with the acquisition and retention of students and with legal changes.

According to Kireeva et al. [29], Achieving high positions in the world educational rankings through competitive advantages strategy by maintaining a high level of competitiveness which can be done through having a development strategy, developed infrastructure and educational programs, raising funds to develop its core activities affected by academic entrepreneurship, as shown in figure 2.

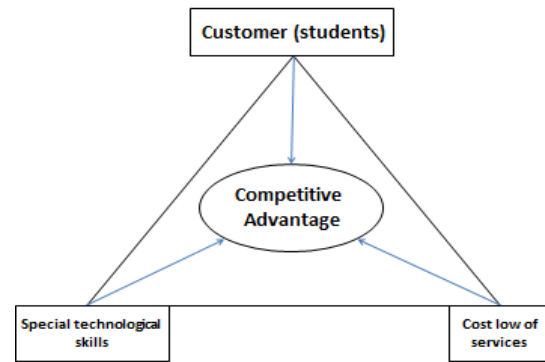


Fig 2. Competitive advantages

## 9.0 METHODOLOGY:

### I. Research Methodology:

This study is designed to investigate the effect of technological vigilance to achieving the competitive advantage in university education among faculty members at Al-Aqsa University. The study follows Descriptive method in trying to reveal the possible effect of technological vigilance on competitive advantage, analyze and determine the hypotheses to reach recommendations and conclusions and drawing the conclusion. The study is used the questionnaire to collect qualitative data that are quantitatively analyzed.

### II. Sources of Data:

Qualitative data has been collected based on the views and trends of faculty members at Al-Aqsa University as the study tries to determine the possible effect of technological vigilance to achieving the competitive advantage in university education. An electronic questionnaire has been distributed, then the resulted data has been expressed in statistical figures as well as applying statistical tools needed to test the hypotheses. The sources of data for the study are included primary and secondary data. The primary data are the results of the questionnaire. The secondary data include books, previous studies, etc., to determine hypotheses and the literature of the study.

### III. Sample:

Al-Aqsa university as a part of the education sector was chosen. The study population consisted of all faculty members at Al-Aqsa University, which are approximately (450) members. A simple random sample with a size of (67) members was adopted.

### IV. Study Tool:

The study is used the questionnaire as a tool to collect primary data. It was designed as follows:

- The first part: includes the personal and functional characteristics of the sample members, and it includes: college, educational degree, years of experience.
- The second part: The questions that measured the independent variable (technological vigilance) after reviewing a group of previous studies, among of them [4,10,5,7,1, 6].
- The third part: The questions that measured the dependent variable (competitive advantage) after reviewing a set of previous studies, among of them [25,26,12,24,21,11].
- Each of the study variables was measured using a five-degree Likert scale.

**V. Reliability and validity:**

To ensure the reliability and validity convergent validity (SRW) and squared multiple correlation (SMC) were used as presented in Table (1).

Table 1. Reliability and validity

Scales	Latent variables	Estimate	S.E.	C.R.	P	SRW	SMC
T1	Technological vigilance	1.00				0.84	0.70
T2		1.13	0.14	8.25	0.0001	0.85	0.72
T3		0.94	0.13	6.97	0.0001	0.76	0.57
T4		0.94	0.12	7.65	0.0001	0.81	0.65
T5		0.97	0.13	7.22	0.0001	0.77	0.60
C1	Cost	1.00				0.96	0.92
C2		0.88	0.10	9.24	0.0001	0.82	0.67
C3		0.88	0.11	8.20	0.0001	0.77	0.59
C4		0.50	0.09	5.83	0.0001	0.62	0.38
F1	Flexibility	1.00				0.87	0.75
F2		0.99	0.11	8.74	0.0001	0.88	0.77
F3		0.98	0.13	7.40	0.0001	0.78	0.60
F4		0.82	0.12	6.77	0.0001	0.73	0.53
Q1	Quality	1.00				0.83	0.68
Q2		1.07	0.16	6.86	0.0001	0.74	0.55
Q3		1.22	0.13	9.17	0.0001	0.91	0.82
Q4		1.20	0.14	8.46	0.0001	0.86	0.74
Q5		1.07	0.13	8.24	0.0001	0.84	0.71

Table (1) shows that all scales were reliability and validity, where SRW and SMC values for all scales were greater than 0.5. Similarly, all p values were significant. Therefore, we can be said that the study tool has proven its conformity with the actual data. This gives the study tool credibility to measure the effect of

technological vigilance on achieving the competitive advantages. The final items are presented in Table (2).

Table 2. Construct measurement

Construct	Item	Measure
Technological vigilance	T1	I constantly monitor technology developments, whether theories, models, experiments or tools
	T2	I use modern technologies to provide various educational services to my students and researchers
	T3	I make sure to get continuous training in different technological fields
	T4	I collect various information on technological developments for use in educational technology innovations
	T5	I am constantly seeking the latest technologies to suit my academic and research WORK
Cost	C1	I control all procedures and processes to control the cost components of the educational and research services that I provide
	C2	I strive to provide grants and external support that facilitate the acquisition of modern technologies at the lowest possible cost
	C3	I make enough effort to achieve a lower cost compared to the competitors
	C4	The cost for the technologies I use is proportional to the cost of design, production and deployment
Flexibility	F1	I have the ability to quickly respond to the change in the request for my educational and research services
	F2	I am interested in studying changes in the university education market in order to adapt to changes in the demand for educational and research services
	F3	I have the ability to provide new educational and research services that meet the needs of the learning and research community
	F4	I am working on amending the operational procedures for educational and research services at a speed that is consistent with the changes in demand
Quality	Q1	I strive to achieve quality in various educational services according to clear and reliable foundations and standards
	Q2	I follow procedures and control processes to achieve quality
	Q3	I strive to provide high-quality educational and research services that meet the desires of the learning and research community
	Q4	I seek to provide technologies that contribute to achieving quality in my educational and research performance
	Q5	I am interested in developing my performance continuously to ensure the achievement of quality in the educational and research services entrusted to me



## 10.0 RESULTS AND DISCUSSION

Table 3 shows the items of the dimensions of each variable, where all values of the reliability coefficient are greater than the acceptable percentage (0.70). The highest mean value is (19.97) for Quality, and next (19.02) for Technological vigilance, and then (15.2) for Flexibility and the lowest mean value is (13.5) for Cost. Also, the table shows that the correlation values between dimensions are significant, so this indicates that there is no linear correlation problem.

Table 3. Reliability, Mean, Std. and Correlation

Variables	Items	Alpha	Mean	Std	Technological vigilance
Technological vigilance	5	0.932	19.02	4.3	
Cost	4	0.871	13.5	3.5	**0.637
Flexibility	4	0.885	15.2	2.99	**0.717
Quality	5	0.918	19.97	3.7	**0.695

The results of the structural model tested for this study are shown in Figure3 and Table 4.

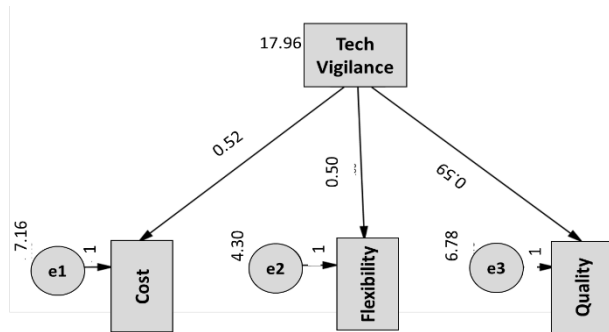


Fig. 3 . Amos. Regression Weights

Table (4). Structural model.

H	Path	B	S.E.	C.R.	P	Supported
H1	Cost < Technological Vigilance	0.52	0.08	6.71	0.001	Yes
H2	Flexibility < Technological Vigilance	0.50	0.06	8.35	0.001	Yes
H3	Quality < Technological Vigilance	0.59	0.08	7.48	0.001	Yes

### I. H1: B = 0.52, p < 0.001

The probability of getting a critical ratio as large as 6.71 in absolute value is less than 0.001. In other words, the regression weight for Technological vigilance in the prediction of cost is significantly different from zero at the 0.001 level (two-tailed). That is, due to both direct (unmediated) and indirect (mediated) effects of Technological vigilance on cost, when Technological vigilance goes up by 1, cost goes up by 0.52.

### II. H2: B = 0.50, p < 0.001

The probability of getting a critical ratio as large as 8.35 in absolute value is less than 0.001. In other

words, the regression weight for Technological vigilance in the prediction of flexibility is significantly different from zero at the 0.001 level (two-tailed). That is, due to the direct (unmediated) effect of Technological vigilance on flexibility, when Technological vigilance goes up by 1, flexibility goes up by 0.50. This is in addition to any indirect (mediated) effect that Technological vigilance may have on flexibility.

### III. H3: B = 0.59, p < 0.001

The probability of getting a critical ratio as large as 7.85 in absolute value is less than 0.001. In other words, the regression weight for Technological vigilance in the prediction of quality is significantly different from zero at the 0.001 level (two-tailed). That is, due to the direct (unmediated) effect of Technological vigilance on quality, when Technological vigilance goes up by 1, quality goes up by 0.59. This is in addition to any indirect (mediated) effect that Technological vigilance may have on quality.

## 11.0 Discussion and Conclusions:

The results of the analysis of the study data indicated that there is a positive effect of technological vigilance on achieving the competitive advantage in university education among faculty members at Al-Aqsa University where the levels of technological vigilance & competitive advantage were high. The studies confirm that the technological vigilance plays effective role and helps to increase market competitiveness through understanding the competitors by using technological sources.[6,5,7,12]

The results represented the attention and awareness of the human, technological, material and financial resources to follow the technological vigilance approach then to achieving competitive advantage in university education. According to [14,24,26,27] show evidence that IT and innovation sources have a great role to get success at the market of competition which allow Al-Aqsa university to enhance exploration strategies by making the best use of all ideas and skills provided by members, this can be achieved by activating mechanisms that encourage brainstorming, workshops and discussion sessions, as well as by providing physical and moral rewards for members who come up with new creative ideas. Further, knowledge acquisition plays an important role in the organization to gain competitive advantage so it has full information about its competitors, policies of governments, customers etc [30, 31].

Technological vigilance has both direct (unmediated) and indirect (mediated) effects on the variable cost and quality to achieve the competitive advantage but it has indirect (mediated) effect on flexibility to achieve the competitive advantage. In other words, the role of the technological vigilance in

deepening universities' experience, through providing the few cost, achieving flexibility, and improving quality in order to improving the use of available resources and developing existing university services to achieve high position at the competitive advantage in high education market. That means according to the studies [29 28,24, 21] the institutions should have main variables like few cost, flexibility and quality through providing the customer the services. The researcher wild Ibrahim ([32] notes that technological vigilance helps to reduce the costs of performing different quality control by improving follow-up & data monitoring, reporting and actual performance measurement. It helps to communicate and access information on the time to support the competitive position in the market.

Based on the above results, it can be concluded that the universities can enhance the competitive advantage by developing strategies & plans which deal professionally with technological vigilance and using information & technology systems in order to support strategic decisions.

## 12.0 Recommendations:

Based on the results reached, the study recommends that universities should pay clear attention to the technological vigilance through which the organization has a real opportunity to learn about technological vigilance and what members' ideas. The study also recommends that the universities should employ committees and teams that specialize in technological vigilance and provide them with all the resources necessary for work to achieve goals.

## Acknowledgement

Hasan R Mahdi is an Assistant Professor of Instructional Technology and Information at Al-Aqsa University with over ten years of research, teaching, and consulting experience in various Instructional Technology and Information disciplines. He received his B.Sc. in educational computer from Al-Aqsa University of Gaza (Palestine), M.Sc. in Instructional Technology from The Islamic University of Gaza (Palestine) and Ph.D in Instructional Technology and Information from Ain Shams University (Egypt). He has extensive experience in teaching and practicing instructional technology, research methods, and learning design. His research interests include educational innovation to improve instructional strategies, such as e-learning and related application. He has published approximately 36 scientific and/or educational papers in refereed International Journals and Conferences.

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