

## Conceptual model of the factors impacting the adoption of Neuromarketing Technologies

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## **Conceptual model of the factors impacting the adoption of Neuromarketing Technologies**

### **Abstract:**

The traditional methods are fading away with scientific methods of taking a plunge into the field of market research. Neuromarketing is the recent technique in market research that is attracting a lot of interest. Despite this boom, large enterprises seem to resist implementing them in their marketing activities, thus limiting the development of the discipline. This research reflects on the main factors that impact the adoption of neuromarketing within large-scale enterprises from a bibliographical perspective. The importance of acceptance of neuromarketing lies upon the fact that business professional, academicians and consumers' attitudes are mixed and in a state of uncertainty. Neuromarketing is waiting for a strong academic and experimental platform on which, it can stand firmly. Therefore, it becomes extremely important to understand the barriers and specifically the enablers of adopting Neuromarketing techniques.

This paper synthesizes the literature review related to theoretical models and factors of adoption and organizational success of technological innovations and exposes a conceptual model of factors impacting the adoption of Neuromarketing. The model is based on four types of factors: Individuals factors, technological factors, organizational factors and environmental factors, the interrelationships of these factors have been established using the TOE model and a literature review.

This research is motivated by the willingness to fill the knowledge gap on the factors impacting the adoption of Neuromarketing, and contributes to the enrichment of the literature on the subject by proposing a conceptual model that will be the guideline and pilot of a future empirical study.

**Keywords:** Neuromarketing, Neuromarketing adoption, innovation, TOE Model

**JEL Classification:** M31

**Paper type:** Theoretical Research

## 1. Introduction:

Neuromarketing is considered as an innovative field of research that has come to challenge the classic model of marketing research, offering better results in understanding the client's affective and cognitive impulses, vital in decision-making Lobna Ben Nasr (2014).

These innovative methods lead to the creation of new types of user interfaces, applications and software that allow companies to "decipher the customer's brain" and adapt marketing practices, products and services accordingly.

The new research approach to neuromarketing has the potential to be a disruptive force as it has the potential to displace traditional market research that has long relied on time-consuming and demanding techniques, such as interviews and focus groups. These traditional techniques – used by advertisers for a century to create, place and measure the effects of advertising – are not well suited to understanding emotions and the unconscious.

Technological developments in the field of information technology, coupled with the increased use of the Internet over the past two decades, have fundamentally transformed market research. Companies need to better understand what customers really think about their brands and products and want to better understand how to interact with customers on an emotional basis. Indeed, in today's rapidly changing global customer marketplace, companies demand simpler, less invasive, faster, and more cost-effective ways to understand their customers' unconscious emotions and feelings. (Lim and al. 2018)

To meet this demand, neuromarketing techniques were divided into two categories: the first category focused on "direct studies" analyzing brain activities, e.g. through the use of electroencephalography (EEG) or the more modern functional magnetic resonance imaging (fMRI); and the second category focused on "indirect studies" analyzing changes in the physiological state of participants, e.g. facial expressions, eye tracking, skin conductance, and heart rate. (Lee and al. 2018)

Beyond neuromarketing's benefits in uncovering thus far hidden data, there are various ethical issues raised by approaching humans' unconscious minds and processes. In fact, ethical concerns are one of the most sensitive challenges in applying neuroscience methods in marketing research Constantinescu, and al. (2019, p.5), in addition to the novelty of the methodology, neuromarketing's limitations include high-priced and time-restricted experiments, the need for immovable devices in conducting neuromarketing research, as well as environmental issues that might arise from the context. (Hensel and all. 2017)

Another challenge in using neuromarketing relates to interpreting neuromarketing research projects' findings, which requires extensive knowledge of neuroscience in order to generate accurate and reliable conclusions and recommendations related to the following action plan, Constantinescu, and al. (2019, p.5).

The adoption of a new technology can occur at two levels: an adoption at the level of consumers and another at the level of organization. The literature abounds with studies that have focused on the adoption of technologies by consumers (Frambacha and Schillewaert, 2002; Hayashi and Klee, 2003). However, in this research, it will be a question of the adoption of technologies within Moroccan private companies.

The literature consulted on the adoption of new technologies brings out the definition of Rogers (2003) as being the reference definition on this research theme. According to Rogers 2003, "adoption is a decision of "full use of innovation as the best course of action available" and rejection is a decision "not to adopt an innovation" (Rogers, 2003, p.177).

This literature also suggests that the adoption process differs from one technology to another depending on the degree of complexity and technological sophistication of the innovation to be implemented (Q. Liu and all., 2020) .In addition, the process of adopting a new technology is not systematic, in the sense that it is very dependent on the perception of companies which may

decide to adopt the technology early or even to delay this decision. (Ransbotham and Mitra, 2010). Until now, the works about Neuromarketing adoption remain almost inexistent, on the other hand, we examined the studies that used technologies close to the Neuromarketing technologies, such as, medical technologies, digital technology, artificial intelligence technologies, and technologies of information and communication (TIC)...

To better understand the diversity of adoption contexts, we will present in the next subsections of the main theoretical models on the adoption of technologies.

## **2. The main theoretical models on the adoption of technologies:**

There is a panoply of theories and models dealing with the subject of the diffusion of innovations and technologies, theories that studies the evaluation, adoption and implementation of innovations in the fields of ideas, products, practices, and philosophies (Prescott and Conger, 1995). Some models are completely original and make major contributions compared to the models that precede them, while others suggest improvements or attempt to fill certain gaps in other existing models.

These models are also distinguished by the differentiated importance they grant to each category of explanatory variable. Thus, some models insist on organizational factors, others on individual factors, or even on technological factors, and finally others on the combination of these two groups of factors. In this work, we do not pretend to review all the existing models on the adoption of innovations and technologies, which would have required the realization of a systematic review of the literature given the large number of these models, but rather we will try to address the most recurrent models and theories in the literature consulted and which, all in all, seem to be the most important.

The different models and theories that have dealt with the issue of technology adoption have generally focused on the stages of adoption and/or the factors affecting the intention or decision to adopt or not.

The articles consulted in the context of this research have made it possible to put forward eight models and theories that address the adoption of innovations or technologies, the classical diffusion theory (Rogers, 1995), the technology acceptance model (TAM) of Davis (1989) with its two versions TAM 1 and TAM 2 an application of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), which is also derived from Ajzen's (1985) Theory of Planned Behavior (TPB), the Technology-Organization-Environment (TOE) model Tornatzky and Fleischer's (1990), the Human-Organization-Technology (HOT) Fit evaluation model, the decomposed theory of planned behavior model Taylor & Todd's (1995) and finally the Unified Theory of Acceptance and Use of Technology (UTAUT, UTAUT2) (Venkatesh et al, 2003, Venkatesh et al, 2021).

The table 1 below briefly presents these different models and theories and summarizes their main contributions and limitations.

**Table 1: Main theories and models of technology adoption**

<b>Theory/Model</b>	<b>Author/ year</b>	<b>Contributions</b>	<b>Limits</b>	<b>Extension</b>
<i>The classical theory of the diffusion of innovation</i>	Rogers (1962)	- Classification of groups of adopters; - The decision/Innovation process	- The absence of the individual dimension in decision-making	- Yes: a first extension by the work of Damapour (1991). - A second extension by Armstrong and Sambamurthy (1999)
<i>The theory of reasoned action TRA</i>	Fisher & Ajzen (1975)	- Identification of 4 categories: Affect, cognition, intention and behavior	- Does not include adoption constraints	- Yes
<i>The theory of planned behavior: TPB</i>	Ajzen (1985)	- Integration of the individual dimension (PCI); - Analysis of adoption behavior according to three dimensions; - The meta-analyses carried out on the TPB show that it has a strong and robust predictive power (Scannell et al., 2012)	- The model contains measurement errors, because intention and behavior only rarely present a reliability higher than 0.75 or 0.80 (Ajzen, 2011)	- No
<i>The technology acceptance model: the TAM</i>	Davis (1989)	- A model that deals with individual characteristics.	- The exclusion of the possibility of the influence of institutional, social and personal control factors.	Yes
<i>Technology Organization Environnement TOE Model</i>	Tornatzky & Fleischer (1990)	- A model that integrates technological, environmental and organizational characteristics/ factors	- The exclusion of individual factors	- No, but it can be combined with HOT-Fit model Yusof 2007
<i>The decomposed theory of planned behavior model</i>	Taylor & Todd's (1995)	- They relied on the idea of rearranging the components of various reference models in an effort to assign more appropriate dimensions to the technology acceptance framework.		- No
<i>Technology Acceptance Model 2: TAM2</i>	Venkatesh et Davis (2000)	- The addition of a relational dimension between the concepts of usefulness and ease of use; - The addition of social constructs and instrumental cognitive processes.	- The model considered too simplistic Bagozzi (2007).	Yes the model has been improved by TAM 3, Venkatesh and Bala (2008) propose a new synthesis, with great detail of many explanatory variables and a grouping of the influence of moderating variables into two

				categories: Experiences and Voluntary use
<b>UTAUT</b>	Venkatesh et al. (2003)	The actual use of a technology depends on the intention of use, which itself is influenced by the determinants, which are the expected performance, the expected effort, the social influence and the conditions of facilitation. Furthermore, this model, unlike previous models, incorporates new categories of so-called moderating variables.	The large number of variables used has led the study of technology adoption to a chaotic stage. Van Raaij & Schepers (2008), considered unnecessarily complex and incomplete Bagozzi (2007).	Yes: a first extension by UTAUT2 Venkatesh et al. (2012) - A second extension by multi-level framework of acceptance and use Venkatesh et al. (2016)
<b>multi-level framework of acceptance and use UTAUT2</b>	Venkatesh et al. (2016)	The model highlights the importance of individual and higher-level contextual factors (IC and HC) that influence the intention to accept and use a technology.		- Venkatesh 2021 proposes a new "research agenda" for UTAUT models, by defining four main research directions for which the links with predictors or moderating factors of intention are yet to be explored.

Source: Formulated by the author based on the thesis Khalil Rhaiem « les déterminants de l'adoption des technologies de pointe par les PME manufacturières », 2014

As mentioned above a variety of models and theories are used to assess and test the acceptance of technologies at the individual level. One of the most used models is the Technology Acceptance Model (TAM) to explain and predict an individual's acceptance behavior towards a new technology. While this theory is useful for understanding why individuals accept technologies across a range of populations, the model is not suited to studying technology acceptance at the organizational level, the decision to adopt neuromarketing technologies is generated at a strategic level within a company.

The frequency of adoption of technology varies from one organization to another and this is the result of a panoply of organizational, individual, technological and environmental factors, which are directly or indirectly correlated with the decision to adopt or do not adopt. As shown in the table 1 above, the main theories and models that deal with the adoption of technologies suffer from significant limitations such as the absence of the individual dimension in decision-making, the exclusion of the possibility of influence institutional, social and personal control factors. (Jerry Li, 2020)

Many research that studies firm-level adoption use Diffusion of Innovation Theory (IDT) (Rogers, 1995), these studies assume that the adoption decision is made to improve operational efficiency (Teo et al., 2003). However, the organizational decision to adopt neuromarketing techniques can also be influenced by the organization's environment - customers, suppliers, other business partners, competitors, and government regulations - which act as barriers and incentives to the adoption of neuromarketing.

Having said that, it is plausible that the firm's institutional environment plays an important role in the organizational adoption decision, along with the characteristics of technology. This study should be grounded in a frame work that considers the influence of those factors, therefore the use of the Technology-Organization-Environment (TOE) model of Tornatzky and Fleischer (1990) will a perfect fir for our research.

Based on the literature review on Neuromarketing, we have identified 4 types of determinants: internal determinants which refer to factors of the organizational type and those of the technological, also referred to as factors specific to the organization (controllable); and external determinants, including factors specific to technology, known as individual factors, and factors related to the environment in which the organization operates (environmental factors).

This taxonomy of factors is found in the model TOE developed by Tornatzky and Fleischer 1990 based on organization theory, they explain in their model that the decision to adopt a technological innovation by a organization relies not only on technology, but also on organizational and environmental contexts (Pudjianto and Hangjung, 2010). The TOE framework has a solid theoretical basis and consistent empirical support, though specific factors identified within the three contexts may vary across different studies. For instance, Zhu and Kraemer (2005) considered the TOE as the important antecedents to understand the diffusion of e-business, while Wang et al. (2010) proposed a TOE-based model for understanding RFID adoption in manufacturing firms that wished to increase supply chain visibility and improve process efficiency. Finally, Weng and Lin (2011) employed the TOE framework to analyze the determinants that influenced the adoption of green practices by small-and medium-sized companies. To construct this study's TOE framework on solid theoretical ground, the consideration factors selected for the decision framework were deliberately drawn from a set of related theories.

### **3. The factors of adoption of Neuromarketing:**

The adoption of NM techniques is considered by the literature as a field management of innovation. Innovation is a subject of study addressed in several social science disciplines, which interests not only managers, but also economists and sociologists. These different

sciences are not interested in it in the same way. The research questions can be different, like the methods used.

Based on the literature conducted we have summarized the main factors impacting neuromarketing adoption into four factors as follows:

### **3.1 Technological factors**

The technological context explains the technologies used and available to the organization. Numerous studies using the TOE model proves that the successful adoption of technology can help organizations to exploit their values and their potential advantages (Srivastava and Teo, 2007). Studies also show that the existence of a well-developed national ICT infrastructure, as well as a conducive global technological environment, is crucial in the process of adopting innovation, and is essential for the proper functioning of technological projects within the organization (Srivastava and Teo, 2007).

Neuromarketing can only be accepted by professionals within an organization if they perceive its usefulness related and if they are convinced that this new technology will help them evolve be more efficient, gain in performance and productivity. (Lee et al., 2007, Ming., 2017)

The work of Attewell (1992) referred to this idea of technological compatibility by approaching it from the angle of absorptive capacity. This theory tried to explain how knowledge barriers can prove to be critical deterrents to the adoption of new technologies.

We address here the value of complexity and ease of use, it should be noted that the research protocol of fMRI techniques is very complicated to execute, and the analysis of the results of Neuromarketing research requires the intervention of experts (Marketing, Neuroscience, technique...), and that the use of these techniques requires solid training. (Kenning et al., 2007, Riedl et al., 2010).

The technical characteristics of the technology, the invasive nature of some tools (fMRI, etc.), the neuro-tools market which is beginning to see the emergence of new pseudo-software tools developed by individuals without respecting codes and standards, the problem of data security and participant privacy are all elements that can inhibit the acceptance of neuromarketing. (McClure et al., 2004).

Mansfield (2004) indicates that the greater the investment required for the adoption of an innovation, the slower its rate of adoption and the lower its rate of diffusion. The decision to adopt advanced technologies ultimately rests on the benefits that the technology offers but also on the costs associated with its adoption. The perceived cost of a department of studies and marketing research and studies is very important to take into consideration, Moroccan companies declare that they cannot see the tangible contribution of such department in the development of the company.

On the other hand, the expensive equipment of technologies, it is true that neuromarketing equipment was always expensive (Hubert & Kenning, 2008). But today, thanks to the development of technology, a complete set of professional neuromarketing equipment costs around \$1,500, not \$50,000. It's still a hefty sum, especially for a small business, but it's far less than the tens of thousands of dollars it used to cost. (NMSBA Book 2022) (Ming Hsu 2017).

Finally, the tangible observability of the results, the possibility of testing the technology and the availability of neuromarketing technologies in the market and in the company are all factors that will promote or block its adoption.

The table below will review the most relevant technological variables that we retain for the study of the adoption of Neuromarketing:



**Table2: Technological factors of neuromarketing adoption**

<b>Factors</b>	<b>Variables/Constructs</b>
<b>Technological</b>	<b>Perceived usefulness/ Relative advantage</b> <i>“The extent to which a potential adopter views innovation as providing an advantage over previous methods of performing the same task. »</i> (Davis, 1989), Kwon and Zmud (1987) and Rogers (1995)
	<b>Perceive compatibility</b> <i>“The extent to which an innovation is perceived to be consistent with existing values, past experience and the needs of potential users. »</i> (Borgman et al., 2013; Li,D and al, 2010)
	<b>Complexity (Ease of use)</b> “The extent to which an innovation is perceived as relatively difficult to understand and use. » (Moore et Benbasat, 1991).
	<b>Perceived cost (Kuan and Chau 2001),</b> The price/cost value is present in almost all types of technologies and appeared in various adoption models including UTAUT(2), C-TAILS and DoI. Perceived cost relates to the installation, service, repairs and maintenance of the technology (Alsulami & Atkins, 2016; Lu, Chi, & Chen, 2014; Steele, Lo, Secombe, & Wong, 2009).
	<b>Testability: Bouarrakia B.M. &amp; Chafik K. (2021)</b> IT is the possibility of testing the innovation before committing to its use. In our case, the possibility of testing and using neuromarketing techniques before committing plays a favorable role for the adoption of neuromarketing.
	<b>Availability:</b> Availability of technology in the market and in the company.
	<b>Observability: (Venkatesh et al. 2003)</b> Defined it as the degree to which the results of the innovation are visible to others. Individuals are more likely to adopt the innovation if they can observe the relative benefits of the technology in question, which could reduce uncertainty about it.

*Source: Authors*

### **3.2 Organizational factors**

The organizational context established in this study has its origins in dynamic capability theory (Teece, D.; Pisano, G 2003) and stakeholder theory (Freeman, R 2010). These theories indicate that organizational factors have a significant importance in the adoption of organizational innovations by companies (Teece, D.; Pisano, G 2003). The theories also suggest that organizations vary in their internal resource bases and procedures, which in turn affects their ability to respond to internal and external challenges and their overall performance. The determining factors of the organizational context are the organizational resources, the internal stakeholders of the organization and the organizational procedures for promoting innovative business practices. These factors determine whether organizations have, recognize and can seize innovation to improve their competitive advantages (Florida, R.; Atlas, M.; Cline, M. 2001).

According to other studies, the main variables that explain the tangible and non-binding factors of the organizational context are: The commitment of senior management, coordination and internal communication, staff skills in ICT, investment and finance, organizational size, organizational compatibility, and organizational resources.

It goes without saying that the adoption of Neuromarketing techniques requires the involvement of top management (Bin et al., 2007). This is still valid for organizations with a conservative culture, which raises the question of resistance to change to innovation (Pudjianto and Hangjung, 2009; Bin et al., 2007).

The decision to adopt Neuromarketing comes from the Top management and the overall strategy of the organization, because it is one of a critical decision, in terms of the criticisms and the ethical issues that follow it (Murphy et al, 2008)

Companies that adopt innovative technologies are generally companies with an organizational culture of advanced innovation that are open to new practices and new ideas.

Jackson and Morgan (1982) argue that organizational structure aims to create a pattern of interdependent tasks, and enables the organization to conduct, coordinate and control its activities. In this context, it is the large companies that are the early adopters of neuromarketing technologies, but today we notice a downside to the benefit of small and medium-sized companies that have better accessibility to tools thanks to digital and AI technologies. (Ming Hsu 2017, Huang, MH., Rust, R.T 2020).

Many companies in Morocco do not have a marketing department and even less marketing research department. Even when it exists and if the company is going through difficulties like the Covid 19 crisis, it is one of the first budget items that bears the brunt of untimely cuts, having said that, strategy and investment management are key elements that can inhibit neuromarketing adoption.

Below we will present the most relevant organizational variables that we retain for the study of the adoption of Neuromarketing:

**Table3 : Organizational factors of neuromarketing adoption**

<b>Factors</b>	<b>Variables/ Constructs</b>
<b>Organizational</b>	<p><b>Organizational resources:</b> “The capabilities that an organization possesses for future needs or dynamic changes” Hwang GW, et al. (2016)</p> <ul style="list-style-type: none"> <li>- <i>Human resources/Staff competency :</i> Gomez and Vargas (2012) have shown that the more qualified the personnel of a firm, the more likely they are to seek to use new technologies. The qualification of the personnel refers to the competence of the employees, their level of experience, and their versatility.</li> <li>- <i>Intangible resources:</i> The organizational learning and the stock of knowledge within the organization, positively influence the absorption capacity of the organization, and therefore its capacity to assimilate technology, and ultimately its adoption. The capacity of a company refers to its ability to identify relevant external knowledge, recognize its value, assimilate it, transform it and apply it for commercial purposes (Zahra and George, 2002).</li> <li>- <i>Material resources: ICT infrastructure</i> Prior technological context in IS researches has shown that organization with sophisticated ICT infrastructure has possibilities increased their chances in implementing IS (Zhu and al, 200). Therefore, we define ICT infrastructure as a collection of physical technology resources, including shared technology and technology services across an organization which provide a foundation for ICT-related services. Kowtha and Choon (2001) examined that IT innovation depends on complementary resources and</li> </ul>

	<p>existing ICT infrastructure, since organization that are already familiar with IT appear to have a positive attitude toward further IT assimilation.</p> <p><b>Top Management</b></p> <ul style="list-style-type: none"> <li>- <i>The vision of the organization's senior management</i> and its knowledge of the innovation or technology to be adopted constitute a significant determinant of the decision to adopt or not this innovation or this technology (Ravichandran , 2005).</li> <li>- <i>Top management support</i> (Mirchandani and Motwani, 2001)</li> </ul> <p><b>Organization culture</b></p> <p>It includes customs and norms, beliefs, shared values and attitudes of members of an organization (Dmour et al., 2017)          Learning culture (Zhu, Kraemer &amp; Sean, 2006; Wang, Wang &amp; Yang, 2010)</p> <p><b>Company structure</b></p> <ul style="list-style-type: none"> <li>- <i>Company size</i>, Fichman (2004: 315) explained this positive relationship between size and the propensity of companies to adopt new technologies by the fact that large companies are generally more diversified, have greater technical expertise , are generally run by technology-friendly managers, and operate in more competitive environments that create pressures for the adoption of new, more efficient technologies. On the other hand, some authors argue that small companies, which are more flexible and characterized by more organic structures, may be more inclined to adopt new technologies than large companies whose organizational practices and routines are more difficult to change (Meredith, 1987 ).</li> <li>- <i>Communicability</i> :                  Udo and Ehie (1999) showed that the level of communication between departments within an organization is positively correlated with the commitment of departments in the innovation adoption process.</li> <li>- <i>Decision process</i>                  - When it is a multinational, decisions and strategies are generally taken at headquarters level and the branches only adapt the strategies. J.Y.Thong (1999)</li> </ul> <p><b>Financing and investment (perceived benefit)</b> Jennifer L. Gibbs &amp; Kenneth L.K. (2004)                  Several authors have insisted on the importance of investments made by the company in research and development (<b>R&amp;D</b>) as a favorable factor in the adoption of innovations and new technologies (Gomez and Vergas, 2012 ). For these authors, R&amp;D acts as an intangible ingredient that contributes to increasing the knowledge base of the company, and therefore ensures that it is better equipped to accommodate new technologies.</p> <p><b>Organizational strategy</b>                  Which promotes the participation of the various departments in the stages of strategic planning, will promote the adoption of innovations.</p>
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Source : Authors

### **3.3 Environmental factors**

Institutional theory concerns firms' responses to institutional pressures within their environments (Scott, W.R. 1995) and assumes that firms generally make rational normative choices based on historical precedent and social justification (Oliver, C.1997). Institutions constrain corporate behavior by defining legal, moral and cultural boundaries and thus distinguishing legitimate behavior and practices from illegitimate behavior. Institutional constraints can be regulatory (constrained by rules, laws and sanctions), normative (normatively imposed by codes of conduct, accreditation or certification) or cultural cognitive (mimetic common beliefs and logic of action ) (Scott, W.R. 1995).

The environmental context explains the environmental conditions in which organizations conduct their services. The main issue in the environmental context is uncertainty (Tornatzky and Fleischer, 1990) and how constant changes can easily affect the innovation adoption process, especially in developing countries.

It refers to the environmental conditions, and how to provide an appropriate environment for the success of the appropriate application of innovations, such as industry structure, degree of competition, external partners, economic conditions, the regulatory and cultural environment. These dimensions greatly influence the organization's decision to assimilate an innovation that affects organizational performance.

Government support reflects government efforts that exert an effect on the individual's and organizations' desire to use technology (Teo et al., 2009). Indeed, the government plays a crucial role in the diffusion of information technologies among citizens and organizations. Chong and Ooi (2008) assert that the government's mission is to establish a solid telecommunications infrastructure and revise the laws to meet the demands of the virtual age. (Zhu and al, 2006; Kuan and Chau, 2001; Grandon, Pearson, 2004, Changand Cheung, 2001).

Government regulation can have a beneficial or detrimental effect on innovation (Jeff Baker, 2011). The adoption of neuromarketing needs constant approval and commitment from a high authority to ensure a legal framework for its operation, which will support and help marketing professionals to have access to medical devices.

Institutional theory argues that normative pressures drive firms to seek legitimacy and trustworthiness (Sarkis, J.; Zhu, Q.; Lai, K.2012). These pressures are exerted by external stakeholders, including customers who have a direct interest in the company (Vachon, S.; Halley, A.; Beaulieu, M.2009). The dimension of pressure from customers and the social community of the company is important in the study of the adoption of Neuromarketing, Neuromarketing is much more accepted when it is used by NGOs than commercial companies according to Koller et al. , (2010), many companies avoid the use of the word neuromarketing in their communication and the media, talking about it is considered a taboo.

According to the institutional theory, companies seek to increase their prestige by imitating those they perceive to have succeeded (Perrow, C.1961). Such mimetic behavior occurs across all competing firms within an industry. Businesses may follow or imitate competitors simply because of the competitors' success in operations and manufacturing. The rationale for such mimicry is simple to understand: by imitating the actions of successful competitors, companies strive to achieve the same success (Zhu, Q.; Sarkis, 2007).

In institutional theory, cultural cognitive isomorphism is seen as the result of a firm's rational desire to engage in behaviors that it perceives as crucial. A company may feel a voluntary obligation to society based on social expectations, norms and codes of conduct (Jones, M.T.1999). A company's social community includes consumer rights organizations, community groups and other special interest groups. In the past, companies were less likely to be influenced by the social community, which they viewed as a nuisance or ignored (Henriques, I.; Sadowsky, P. 1999).

The lack of enthusiasm aroused by this sector among the graduates of the superior schools and universities (because it is poorly highlighted) where specialized masters are non-existent (at least in Morocco) which creates a serious shortage of talent both on the side of businesses than service providers. Collaboration and cooperation at local, regional, and national levels, as well as between public and private organizations, are important elements in the process of adoption and development of neuromarketing. However, they are not easy to achieve. Citizens are wary of companies that use neuromarketing (Koller, 2010). To ensure that the public and stakeholders will be partners in the acceptance of neuromarketing, it is important to try to build a framework of trust.

Between TV shows that demonize neuromarketing (Example; Cash investigation France), videos on social networks that popularize the concept, and editorials in famous newspapers (such as the New York Times, Forbes), so many media sources that create polemics and debates, which explains the considerable role of the media in the acceptance of neuromarketing.

Below we will present the most important variables related to the environments selected for the study of the adoption of Neuromarketing:

*Table 4 : Environmental factors of neuromarketing adoption*

<b>Factors</b>	<b>Variables/ Constructs</b>
<b>Environmental</b>	<p><b>Government regulations</b>  <i>“Formal mechanisms (eg, standards, laws, procedures, and incentives) that are determined by regulatory institutions and that require individual or organizational compliance. » Jeff Baker, 2011)</i>                      Government regulation can have either a beneficial or a detrimental effect on innovation : (Jeff Baker, 2011)</p>
	<p><b>Customer Pressure</b>  <i>“Customers whose response to company practices affects company decisions to adopt ethical policies that respect the will of consumers”</i>                      In other words <i>consumer readiness</i> (Zhu, Kraemer &amp; Sean, 2006 ; Zhu and Kraemer, 2005), in our context means consumer’s readiness to participate in NM experiences and to consume products of companies using NM technologies.</p>
	<p><b>Competitiveness (competitive pressure)</b>  <i>It represents the degree of competition specific to the environment of the organization. The greater the competitive pressure, the higher the degree of innovativeness of an organization is assumed to be. The various empirical studies all show a positive association between the degree of competitive pressure and organizational innovation, whether products (Capon et al., 1992; Miller and Friesen, 1983), technological ( Kitchell, 1995, ElAbbassi and Chafik, 2014) or managerial (Kimberly and Evanisko, 1981).</i></p>
	<p><b>The Mimetic Pressure</b>                      It corresponds to a pressure undergone by the organization which encourages it to imitate the innovative behavior of other organizations. The stronger the mimetic pressure in the environment of an organization, the higher its degree of innovativeness is assumed to be. Adoption based on mimicry is determined by the desire to imitate the managerial practices of pioneering companies in the use of innovations. (Alziady.A, and al ; 2019) ou ce qu’on appel la théorie de <i>l’externalité de réseau</i></p>
	<p><b>A company's social community</b>                      This includes consumer rights organizations, community groups and other special interest groups.</p>

	<p><b>Industry structure</b></p> <ul style="list-style-type: none"> <li>- Level of maturity of the marketing market in Morocco impact negatively the development of Neuromarketing.</li> <li>- The marketing research sector is doing poorly with the Covid crisis.</li> </ul>
	<p><b>Suppliers</b></p> <p>Pan and Jang (2008), among other researchers, reveal how pressure from business partners is a key determinant of technology adoption and use. Marketing activities, targeted communications and previous projects carried out by these business partners can have a significant impact on a potential customer's decision whether or not to adopt new innovations. (Low, C., and al 2011)</p> <ul style="list-style-type: none"> <li>- Trust in the supplier of Neuromarketing tools</li> <li>- Availability of agencies offering neuromarketing tools.</li> <li>- Supplier selection process</li> <li>- Supplier skills and expertise</li> </ul>
	<p><b>External partners</b></p> <ul style="list-style-type: none"> <li>- Lack of partnership between university research laboratories, companies and hospitals that have neuroscientific equipment is limiting the development of Neuromarketing industry.</li> </ul>
	<p><b>Media</b></p> <ul style="list-style-type: none"> <li>- Media influence mainly refers to the influence of mass media (TV, radio and newspapers) and expert reports (Bhattachajee, 2000), (Rogers 2003) emphasizes the importance of the influence of the media in determining the adoption of technologies and innovations. Hong et al., (2019) provide empirical support for the impact of media influence on intentions and behaviors.</li> </ul>

Source: Authors

### 3.4 Individual factors:

In addition to the three factors explained above, here we include another type of factors “Individual”. As we have observed in various research, this factor has been categorized under organizational factors in many studies, but to get a holistic view of this factor, we separate it and place it in the new individual context. By reviewing the neuromarketing literature, we discovered that the issue of adoption of neuromarketing techniques is conditioned by individual factors.

Given the evolution of neuromarketing research and the thorny ethical issues associated with neuromarketing practices, it stands to reason that consumer and professional attitudes are mixed and in a state of uncertainty. Flores, Baruca, and Saldivar (2014) succinctly characterized the lack of consistency in consumer perceptions of neuromarketing ethics. Perceptions of NM are likely to be influenced by a variety of factors, including beliefs about science and technology, demographic factors, and third-party sources (e.g., word of mouth, university courses, mass media), risk perception, level of knowledge, demographic characteristics, etc. (Eser & al 2011, Koller & all 2010; Hamed & al, 2013; Kimmel & all 2016).

In the following, we have listed the main indexed articles that have studied the perception and attitude towards neuromarketing of neuromarketing actors (consumers, neurologists, marketing professionals and academics).

**Table 5 : Main articles about the perception and attitude of neuromarketing**

Authors	Title	Methodology	Theory	Variables & Constructs
<b>Cooke et al (2007)</b> <b>Senior et al (2007)</b>	- <i>The neuroimaging research process from the participants' perspective</i> - <i>Mapping the mind for the modern market researcher</i>	Mixed method	Not mentioned	Experience of fMRI, Knowledge of techniques, attitudes towards fMRI
<b>Tolon, M., Özdoğan, F. B., &amp; Eser, Z. (2008)</b>	<i>Testing cognitive dissonance theory: consumers' attitudes and behaviors about NM</i>	Quantitative study	Cognitive Dissonance Theory (Leon Festinger 1957)	Knowledge & awareness, NM éthique, NM participation and interest
<b>Eser et al ; 2011</b>	<i>Perception of Marketing academics, neurologists, and marketing professionals about NM</i>	Exploratory study, mixed method	Not mentionned	Knowledge & awareness, NM ethic, NM participation and interest
<b>Koller 2011</b>	<i>Consumer's attitude Towards applying fMRI in Marketing research</i>	Mixed method	Exchange theory, Technology acceptance theory	Technology Anxiety, perceived Risk, Intrinsic Motivation, Extrinsic motivation, Attitude, Consent to participate
<b>Hamed et al ; 2013</b>	<i>Attitude Measurement toward Neuromarketing in Sports</i>	Descriptive survey	Not mentioned	Three sub-scales of interest and participation in neuromarketing, consciousness and cognition, and morality were studied and compared among these three groups
<b>Flores, et a ; 2014</b>	<i>Is neuromarketing ethical. Consumers say yes. Consumers say No.</i>	Quantitative study	Normative theory of ethic (Shaw 2008), (Hunt & Vitell 1986) Ethical dilemma model	Ethical judgment of NM, Purchase intentions, Word-of-mouth intentions, Switching propensity
<b>Egrie, J. &amp; Bietsch, S. (2014)</b>	<i>Marketing research ethics: How consumers feel about neuromarketing. (Acte de Conférence)</i>	Quantitative study	Not mentioned	Knowledge & Awareness, NM ethic
<b>Elitza Bakardjieva &amp; Allan J. Kimmel 2016</b>	<i>Neuromarketing Research Practices: Attitudes, Ethics, and Behavioral Intentions</i>	2 Quantitative study	Not mentioned	Knowledge & awareness, NM éthique, NM participation and interest, science perception, attitudes towards science, Ethical ideology, attitude towards technology
<b>Pop et al; 2016</b>	<i>Ethical Responsibility of Neuromarketing Companies in Harnessing the Market Research – A Global Exploratory Approach</i>	Exploratory study Qualitative study	Not mentioned	Neuromarketing ethical features

<b>Ugur Bakir, Muge Elden, Erdem Gecit 2017</b>	<i>Neuromarketing from the Perspective of Advertising Professionals</i>	Interpretative phenomenology analysis (IPA), Qualitative.	Not mentioned	NM and advertising research, perspectives on NM and related topics, the future of NM.
<b>Hensel et al.,2017</b>	<i>Conducting neuromarketing studies ethically-practitioner perspectives</i>	An exploratory, qualitative study. 10 NM experts	Grounded theory	17 questions in total to explore the ethic perception.
<b>Mihai Monica 2019</b>	<i>A study of banking marketers' perception regarding the use of neuromarketing techniques in banking services</i>	Quantitative study	Not mentioned	Consumer dimensions that banking marketers would like to study through NM techniques.
<b>Kurtoglu, A. L., Ferman, A.M., (2020).</b>	<i>Exploratory research among fashion business leaders and neuromarketing company executives on the perception of applied neuromarketing</i>	Qualitative study	Not mentioned	Knowledge about neuromarketing, Willingness to make use of neuromarketing research, Willingness to conduct neuromarketing, Ethical concerns.
<b>Verónica Crespo-Pereira<sup>1</sup>, et al (2020)</b>	<i>Implementing Neuromarketing in the Enterprise: Factors That Impact the Adoption of Neuromarketing in Major Spanish Corporations</i>	self-administered online questionnaire distributed amongst senior decision makers	The diffusion of innovation theory studies the evaluation, adoption, and implementation of innovations (Prescott and Conger, 1995)	Ethical, economic, professional, technological, and cultural aspects

Source: Formulated by authors based on the review and analysis of 15 recent indexed scientific research (Scopus, Google scholar)



The concept of attitude, widely used in technology acceptance models, was borrowed from psychological theories, which showed that behaviors regarding an object are subject to the attitudes that have formed about that object.

The powered reason theory of Fishbein and Ajzen (1975), which was presented above provides the necessary theoretical support for further specific developments.

Moreover, some researchers emphasize the role of attitude based on the finding of the cognitive theories (Yang and Yoo, 2004), insist on the role of cognitive attitudes (which also impact affective attitudes, but those have no significant effect on the use of technology) as antecedents of the action. Since this last element has not been supported by other research, we consider the theory of reasoned action (TRA) to be the best theoretical support understanding individual factors.

Based on the results of the literature review on the concept of attitude and perception of the different actors of Neuromarketing (Consumers, neurologists, marketing professionals, academics), we have drawn up the table below with the most accurate variables of individual factors.

*Table 5: Individual factors*

<b>Factors</b>	<b>Variables/ Dimensions</b>
<b>Individual</b>	<b>Knowledge and Awerness</b> (Eser et al ; 2011) - The discipline is little known - A huge confusion between neuromarketing and neighboring disciplines such as (Neuroeconomics, sensory marketing, etc.)
	<b>Attitude towards technology</b> (Elitza Bakardjieva & Allan J. Kimmel 2016) <i>Negative attitude:</i> Lack of transparency and the Buy botton (de Sousa, 2018), Manipulation, Trust, Word of mouth, <i>Intrusion into privacy, technology anxiety</i> <i>Positive attitude</i>
	<b>Perceived risk</b> (Koller, 2011) Perceived risk is defined as the citizen's belief that he will suffer a loss while pursuing a given result (Warkentin and Gefen, 2002). - <i>fMRI techniques are considered risky</i>
	<b>Intrinsic motivation:</b> (Koller, 2011) - <i>Scientific curiosity</i> <b>Extrinsic motivation:</b> (Koller, 2011) - <i>Financial incentive</i>
	<b>Participation and interest in neuromarketing experiences</b> (Eser et al ; 2011)
	<b>Attitude towards science</b> (Elitza Bakardjieva & Allan J. Kimmel 2016)
	<b>Ideology of ethics</b> (Flores, et a ; 2014)
	<b>Ethic perception</b> (Eser et al ; 2011)

*Source: Authors*

#### **4. Conceptual model of the factors impacting the adoption of Neuromarketing**

Through the review of the literature, it was important to analyze these different constructs, to structure and classify them to determine the most relevant factors for the analysis of the problem addressed in the context of our research. The mobilization of a conceptual model is fundamental in the context of an exploratory research such as ours. The conceptual model help to organize and structure the empirical study but also makes it possible to go back and forth between the

field and the theory in order to confirm certain concepts and even sometimes certain research proposals and thus enrich the knowledge produced.

The conceptual model below (Table 6) based on the TOE model brings together the main factors having an impact on the adoption of Neuromarketing technologies.

**Table 6: Our final conceptual model**

<b>Factors</b>	<b>Definition</b>	<b>Theories</b>	<b>Variables /Constructs</b>
<b>Technological</b>	Refers to technological attributes relevant to the innovation in question	Innovation Diffusion Theory (IDT) (Rogers, 1983-2010). TAM Model Decomposed theory of planned behavior TOE framework	- Perceived usefulness - Perceive compatibility - Complexity (Ease of use) - Perceived cost - Observability - Testability - Availability
<b>Organizational</b>	Refers to the characteristics of the business, including its size, resources, and the complexity of its managerial structure	Dynamic capabilities theory Stake holder theory <sup>1</sup> TOE framework	- Organizational resources - Top management - Organizational culture - Company structure - Financing and investment - Organizational strategy
<b>Environmental</b>	Refers to the environment in which a company conducts business; this may include the company's industry, its customers, its competitors, and the government.	Institutional theory Porter (1980) W. DiMaggio et P. Powell (2004, 2012) TOE framework	- Government regulations - Customer Pressure - Competitiveness - Mimetic pressure - Social community - Industry structure - Suppliers - External partners - Media
<b>Individual</b>	Refers to the attitude and perception of individuals towards the adoption of technology.	The TAM model (Based on the reasoned action theory of Ajzen and Fishbein (1975) Cognitive Dissonance Theory (Leon Festinger 1957) Normative theory of ethic (Shaw 2008), (Hunt & Vitell 1986) Ethical dilemma model	- Knowledge & Awerness - Attitude towards technology - Perceived Risk - Intrinsic and Extrinsic motivation - Participation and interest - Attitudes towards science - Ethical ideology - Ethic perception

*Source: Authors*

## 5. Conclusion:

This paper's main objective was to identify the factors that influence the decision of organizations to adopt Neuromarketing technologies. Furthermore, the use of TOE as a theoretical framework was investigated in this study. One of the main contributions of this paper is the extraction and classification of all factors that have been found influential in adopting neuromarketing technologies by organizations, following the TOE framework and DOI theory. Summaries and comparative analysis for innovation adoption theories were also presented. Their contributions, limits and how the models and theories were extended.

The technological, organizational, and environmental factors discussed in this paper reveal their potential interrelation to construct a conceptual adoption model used with other individuals' factors to study the Neuromarketing adoption in different contexts, that may be used by academia as a model/framework to undertake further research for the adoption of NM.

<sup>1</sup> These theories indicate that organizational factors matter significantly in firms' adoption of organizational innovations

Note that the factors identified from the literature and used in our model are variables that positively or negatively impact the adoption of a new technology and can therefore have an influence on the adoption of the contactless service which represents a new technology.

It should be noted that the position of these variables in the model is not clearly determined at this stage of the research. Thus, for quantitative research and during the development of the hypotheses, it is essential to causally recognize the independent variables, the moderators and the mediators. Moreover, we do not claim that these are the only variables that can explain the adoption of the contactless service.

Finally, we think that the developed framework will be able to contribute to the development of a rigorous conceptual model of adoption of the contactless service, by selecting the most appropriate variables, knowing that, to our knowledge, no prior study has dealt with the adoption of the Neuromarketing technologies.

Nonetheless, the paper is not without limitations. As this paper focuses on all the factors that may impact the adoption of Neuromarketing in the organization. Hence, it is difficult to specify the importance of each variable and the nature of influence by distinguishing enablers factors from barriers to NM adoption. For a precision perspective, a qualitative study can be considered such as conducting interviews to receive more detailed information and precise explanation from NM stakeholders on the factors affecting the adoption of NM and nature of the influence (positive or negative).

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