



Proceedings Book Series -PBS-

**11th International Conference on Business
Economics, Marketing & Management Research**

-BEMM-

Editor : Dr. Ahmed Rhif (Tunisia)



CNPSI

Centre National de la Promotion Scientifique et de L'innovation

Proceedings Book Series -PBS-

**11th International Conference on Business
Economics, Marketing & Management Research**

-BEMM-

Editor : Dr. Ahmed Rhif (Tunisia)

**PBS-Vol. 10
ISSN: 2961-6611**

Committees

Honorary Partners

Dato' Dr. Mohamed Yussof Ghazali (MYS)

CEO of NUSATEK Company

Prof. Dr. Moh Asri Moh Noor (MYS)

Dean of Management Faculty (UPSI)

Dr. Kamaljeet Kaur (MYS)

Director Partnership (IUL)

Honorary General Chairs

Abdennassar El Figha (MOR)

Jalila Bouanani El Idrissi (MOR)

Laoudj Ouardia (ALG)

Mihoub Ouahiba (ALG)

General Chairs

Ahmed Rhif (TUN)

Hassiba Djemaa (ALG)

Mounsi Demmouche Nedjoua (ALG)

Ndeye Astou Manel Fall (SEN)

Steering Committee

Abdoulaziz Alhassane (SEN)

Afef Khalil (TUN)

Afef Trabelsi (TUN)

Ahmad Outfarouin (MOR)

Ahmed Charif (MOR)

Benchrifia Hanaa (MOR)

Benhabib Lamia (ALG)

Chettat yacine (ALG)

Fatoumata Gaye (SEN)

Hadiza Moussa-Saley (SEN)

Imen Baccouche (TUN)

Lamia Larioui (MOR)

Sebai Jihane (FR)

Yavo Chaba Estelle Stéphanie (SEN)

Zohra Haouam (MOR)

Technical Committee

Aida Arjoun (TUN)

Axelle Martin (FR)

Bouchaib Ferrahi (MOR)

Bouazouni Omar (ALG)

Fahssis Latifa (MOR)

Faical Mahrek (MOR)

Hanan Amin Barakat (EGP)

Harrizi Driss (MOR)

Ikhlef Nadia (ALG)

Imane Erramli (MOR)

Imen Kouas Ben Aoun (TUN)

Kensi Ahmed (MOR)

Kerkoub Ibrahim Azzedine (ALG)

Kherchi Medjden Hanya (ALG)

Manel Ben Ayed (TUN)

Methlouthi Kawther (TUN)

Méziiane Aïder (ALG)

Mohamed Boukherouk (MOR)

Mor Welle Diop (SEN)

Mounsi Mourad (ALG)

Nada Soudi (MOR)

Nadia Zrelli (TUN)

Serigne Moussa Dia (SEN)

Souad Elmanssour (MOR)

Zakaria Ez-Zarzari (MOR)

Zeinabou Aw (SEN)

Summary

| | |
|--|----|
| Is Scrupulosity Related to Religious Political Brands' Evangelism? <i>Rania Essouei, Nedra Bahri Ammari</i> | 1 |
| Efficiency Assessment of Tunisian Thermal Power Plants using Two stage Double Bootstrap Data Envelopment Analysis <i>Meriam Belgaroui, Olfa Kammoun</i> | 6 |
| The Role of Personality in Consumer Animosity <i>Rania Essouei, Nedra Bahri Ammari</i> | 13 |
| Evaluation of the Effectiveness of a Pharmaceutical IMS Based on Internal Dynamics of Knowledge Management <i>Faten MAAZOUN, Karima BOUZGUENDA</i> | 21 |
| What motivate social mavens as micro-influencers to create brand related content in instagram? An instanography approach <i>Wifek Abdelkafi, Nibrass Hadjtaieb Elaoud</i> | 29 |
| Proposing a conceptual research model for lean and green supply chain to achieve sustainability performance <i>Mohamed Mabrouk, Raoudha Kammoun</i> | 41 |
| Relationship between economic growth and the human development index in Algeria: econometric study between 1990 and 2022 <i>Gribi Djamil</i> | 51 |

Is Scrupulosity Related to Religious Political Brands' Evangelism?

Rania Essouei^{#1}, Nedra Bahri Ammari^{#2}

IHEC Carthage, Tunis, Tunisia

¹r.essouei@gmail.com

²Nedra.bahri.ammari@ihec.ucar.tn

Abstract— Scrupulosity is a type of Obsessive-compulsive disorder (OCD). It is a pathological fear of thinking or acting contrary to moral and religious principles. Religion is a powerful predictor of a person's voting habits. Voters' perceptions on topics like abortion, homosexuality, the environment, and the economy are greatly influenced by religious beliefs. We seek to know whether being scrupulous means feeling the obligation to vote for a religious political brand or not, and if so whether it involves compulsively engaging in inviting people to vote for the party thinking that if the person does not do enough evangelism for it, other people will be lost and it will be their fault. The zeal of a brand's devotees who wish to convince other consumers to vote for the political brand is known as political brand evangelism. We are at the data collection stage of the quantitative research.

Keywords— Scrupulosity; brand evangelism; political marketing; voting intention; religion.

I. INTRODUCTION

The term "brand" is now commonly used in political discussions and everyday conversations. According to the American Marketing Association (AMA), a brand is the "*name, term, design, symbol or any other feature that identifies one seller's goods or service as distinct from those of other sellers.*" This definition appears to apply to more than a political science concept.

Nielsen [14] defines the political brand as: "*political representations that are located in a pattern, which can be identified and differentiated from other political representations.*"

Even given this definition as a starting point, the notion of political branding may be used in a variety of ways. As a result, political branding research has expanded in many directions in recent years in the field of political marketing.

Numerous contributions have been proposed, ranging from anthropological roots [6], [16] to psychology and economics [8]. Furthermore, the concept of political brand is applied to a wide range of research objects, including citizens, voters, leaders, members, communities, communications, companies, politicians, social groups, parties, non-governmental organizations, public sector organizations, nations, and other entities, actors, or processes (see for example, [12], [16], [22]). Only one aspect of the brand idea will be explored in this study: the perspective of the political brand based on parties. A political party is defined as "*an organized group of people with at least roughly the same political aims and opinions that seek to influence public policy by electing their candidates for public office*" [15].

II. Scrupulosity

Obsessive-compulsive disorder (OCD) is a debilitating psychological illness characterized by persistent, intrusive obsessions and compulsions that are performed to relieve distress. Researchers have identified four common themes: 1) contamination; 2) doubts and responsibility for harm; 3) symmetry, completeness, and exactness; and 4) unacceptable/taboo thoughts [24]. These themes are the foundation of the Dimensional Obsessive-Compulsive Scale, a validated self-report instrument (DOCS; [2]). Scrupulosity is classified as part of the unacceptable/taboo ideas component, which is characterized by the presence of distressing sexual, violent or religious obsessions that are frequently accompanied by mental rituals and other calming actions [23]. Religious obsessions represent 10 percent of OCD sufferers' principal obsessions [7] and 26 percent of OCD sufferers report that religious obsessions are one of their current obsessions [17]. Nonetheless, scrupulosity is rarely investigated [1], [22].

Scrupulosity is defined by intrusive and persistent religious or moral obsessions, as well as the desire to engage in excessive compulsive actions in order to alleviate suffering [3]. Committing religious offenses, having blasphemous ideas and images, anxiety over performing religious rituals, and fears of inadequate religiosity or encountering divine punishment are all related to Scrupulosity religious obsessions [1]. Similarly, morality-based obsessions may be associated with worries of having acted immorally, as well as having immoral thoughts or urges, as well as a fixation on set moral standards [13]. Worries of religious or moral misconduct and also fears of divine retribution, are the source of the compulsions. Excessive praying, repeating of religious rites until perfection is attained, reassurance-seeking from clergy and important others, and extreme

confession are all prevalent compulsions, according to Abramowitz and Jacoby [1]. Avoidance of triggering material, such as religious symbols and places of worship, is likewise linked to scrupulosity [22].

Jaimie Eckert, a scrupulosity coach who is completing her PhD in Religion, talks about her journey with scrupulosity in her book "*Psalms from the scrupulous*". She testifies that she used to compulsively engage in evangelism thinking that if she does not do enough evangelism, other people will be lost and it will be her fault. In this study, we would like to know if the evangelism includes religious party evangelism when it comes to the political matters.

Religion impacts people's moral standards, which in turn affects party preference [11]. Religion is a powerful predictor of a person's voting habits. It has a significant influence on how voters see issues like abortion, homosexuality, the environment, and economics. The voter then utilizes his responses to these topics to assist him choose which party to vote for. As a result, it's plausible to assume that religion has a considerable impact on how people vote in elections [9], [5]. Hence:

H1: scrupulosity has a positive effect on voting intention.

III. Political Brand Evangelism

Brand evangelism is defined as "*the active behavioral and vocal support of a brand including actions such as purchasing the brand, disseminating positive brand referrals, and convincing others about a focal brand by disparaging competing brands*" [4]. It is a system where consumers play an important role in it through word of mouth. It is actually beyond spreading word of mouth [20]. Brand evangelists are active consumers with deep passion and emotion who try to spread positive opinions and attach the others to the same brand. Indeed, the spread of the latter became "*faster and more qualified with the development of social media and the Internet*" [10]. The concept of evangelism marketing, according to Beyaz and Gungor [26], has a rising trend in the field.

Brand evangelism includes three variables: Purchase intentions, positive brand referrals, and oppositional brand referrals [18]. These referrals and recommendations are able to sell better than the seller itself especially when it comes to positive brand referrals, they provide significantly better profits in the long run than ads which are more suitable for short-term promotions [25].

In politics, brand evangelism includes, positive brand referrals, oppositional brand referrals and voting intention. Positive brand referrals mean spreading positive word of mouth about the favourite party. For example, if someone is being indecisive about who to vote for, the person would recommend voting for this particular party. He actually recommends voting for the party whenever the subject is brought up. Oppositional brand referrals mean, when someone is trying to decide who they are going to vote for, the evangelist would recommend not voting for other competing parties. He would try to dissuade others from voting for other parties and would likely spread negative word of mouth about them [4]. Voting intention is defined as "*the willingness of a voter to vote for a particular candidate representing a political party*" [19]. In other words, voting intention means planning, considering or hoping to vote for a party. It can be used to quantify the tendency of a citizen to vote for a candidate.

According to Becerra and Badrinarayanan [4], purchase intention has a positive effect on both positive brand referrals and oppositional brand referrals, and positive brand referrals has a positive effect on oppositional brand referrals. Hence:

H2: voting intention has a positive effect on positive brand referrals.

H3: voting intention has a positive effect on oppositional brand referrals.

H4: positive brand referrals have a positive effect on oppositional brand referrals.

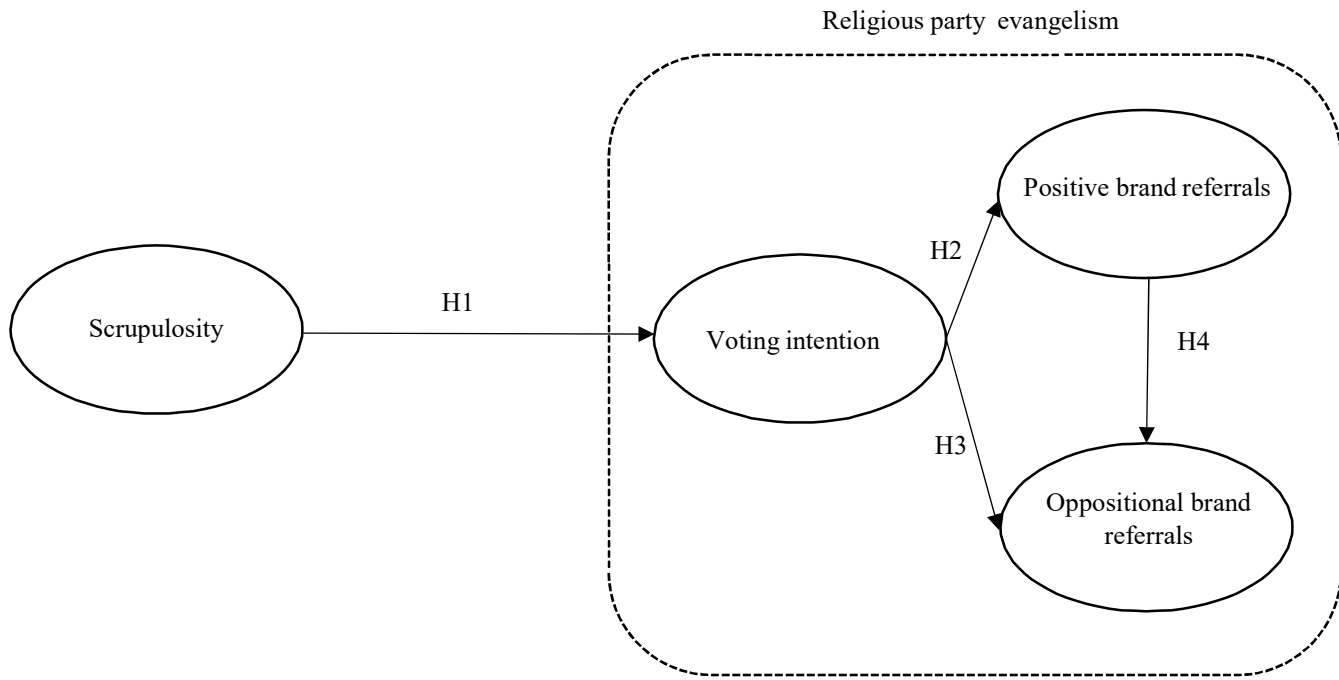


Figure N°1: Conceptual model

Table I
 Measuring Scales.

| Scale | Variable | Items | Scoring |
|-------------------------|--------------|--|---------|
| Scrupulosity scale [22] | Scrupulosity | About how much time have you spent each day with immoral thoughts and with behavioral or mental actions to deal with them? | 5 |
| | | To what extent have you been avoiding situations, places, objects and other reminders (e.g., numbers, people) that trigger immoral thoughts? | |
| | | When immoral thoughts come to mind against your will how distressed or anxious did you become? | |
| | | To what extent has your daily routine (work, school, self-care, social life) been disrupted by immoral thoughts and efforts to avoid or deal with such thoughts? | |
| | | How difficult is it for you to disregard immoral thoughts and refrain from using behavioral or mental acts to deal with them when you try to do so? | |

| | | | |
|----------------------------|------------------------------|---|---|
| Brand evangelism scale [4] | Voting intention | In the next elections, I would probably vote for a religious party. | 5 |
| | | In the next elections, I intend to vote for the candidate of this religious party. | |
| | | I would likely vote for this religious party in the next elections | |
| | | I would possibly vote for this religious party. | |
| | Positive Brand Referrals | I spread positive word of mouth about this religious party | 5 |
| | | I recommend this religious party to my friends | |
| | | If my friends were looking for a party to vote for, I would tell them to vote for this religious party | |
| | Oppositional Brand Referrals | When my friends are looking for a party to vote for, I would tell them not to vote for any of the other parties | 5 |
| | | I would likely spread negative word of mouth about the other parties | |

Bibliography

- [1] Abramowitz, J. S., & Jacoby, R. J. (2014). Scrupulosity: A cognitive-behavioral analysis and implications for treatment. *Journal of Obsessive-Compulsive and Related Disorders*, 3, 140-149.
- [2] Abramowitz, J. S., Deacon, B. J., Olatunji, B. O., Wheaton, M. G., Berman, N. C., Losardo, D., Timpano, K. R., McGrath, P. B., Riemann, B. C., Adams, T., Björgvinsson, T., Storch, E. A., & Hale, L. R. (2010). Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the Dimensional Obsessive-Compulsive Scale. *Psychological Assessment*, 22, 180–198.
- [3] Abramowitz, J. S., Huppert, J. D., Cohen, A. B., Tolin, D. F., & Cahill, S. P. (2002). Religious obsessions and compulsions in a non-clinical sample: The Penn Inventory of Scrupulosity (PIOS). *Behavior Research and Therapy*, 40, 825-838.
- [4] Becerra, Enrique P., and Vishag Badrinarayanan. "The influence of brand trust and brand identification on brand evangelism." *Journal of Product & Brand Management* (2013).
- [5] Botterman, Sarah, and Marc Hooghe. "Religion and voting behaviour in Belgium: An analysis of the relation between religious beliefs and Christian Democratic voting." *Acta Politica* 47.1 (2012): 1-17.
- [6] Dermody, J., & Scullion, R. (2001). Delusions of grandeur? Marketing's contribution to "meaningful" Western political consumption. *European Journal of Marketing*, 35(9/10), 1085–1098.
- [7] Eisen, J. L., Goodman, W. K., Keller, M. B., Warshaw, M. G., DeMarco, L. M., Luce, D. D., & Rasmussen, S. A. (1999). Patterns of remission and relapse in obsessive-compulsive disorder: A 2-year prospective study. *Journal of Clinical Psychiatry*, 60, 346–351.
- [8] Gareth Smith & Alan French (2011) Measuring the changes to leader brand associations during the 2010 election campaign, *Journal of Marketing Management*, 27 :7-8, 718-735.
- [9] Gibbs, Aimée K. "Religiosity and Voting Behavior." *McKendree University Scholastic Journal* (2005).
- [10] Göktaş, Bora, and İnci Erdoğan Tarakçı. "Marka evangelizminin satın alma bağımlılığı, satın alma niyeti ve tavsiyede bulunma üzerindeki etkisi: taraftar ürünleri örneği." *İşletme Araştırmaları Dergisi* 12.1 (2020): 126-145.
- [11] Langsæther, Peter Egge. "Religious voting and moral traditionalism: The moderating role of party characteristics." *Electoral Studies* 62 (2019): 102095.
- [12] Marsh, D., & Fawcett, P. (2011). Branding, politics and democracy. *Policy Studies*, 32(5), 515–530.
- [13] Miller, C., & Hedges, D. W. (2008). Scrupulosity disorder: An overview and introductory analysis. *Journal of Anxiety Disorders*, 22, 1042-1058.
- [14] Nielsen, S.W., 2013. Marketized Politics–Party Strategy and Voter BrandConsumption (Ph.D. dissertation). Copenhagen University Press,Copenhagen
- [15] OLANREWAJU, J. S. (2015). Political parties and poverty of ideology in Nigeria. *Afro Asian Journal of social sciences*, (3), 1-16.
- [16] Phipps, M., Brace-Govan, J., & Jevons, C. (2010). The duality of political brand equity. *European Journal of Marketing*, 44(3-4), 496-514.
- [17] Pinto, A., Mancebo, M. C., Eisen, J. L., Pagano, M. E., & Rasmussen, S. A. (2006). The Brown Longitudinal Obsessive Compulsive Study: Clinical features and symptoms of the sample at intake. *Journal of Clinical Psychiatry*, 67(5), 703-711.
- [18] Pornsrimate, Kanyawee, and Anon Khamwon. "Building Brand Evangelism through Social Media Micro-Influencers: A Case Study of Cosmetic Industry in Thailand." *International Journal of Social Science Research* 2.3 (2020): 84-99.
- [19] Rachmat, M. (2010). Women Intentions to Vote: The Effect of Personal Factor and Social Pressure (Case of Ternate Mayor Elections).
- [20] Samson, A. (2006), "Understanding the buzz that matters: negative vs positive word of mouth", *International Journal of Market Research*.
- [21] Smith, G., & French, A. (2009). The political brand: A consumer perspective. *Marketing Theory*, 9(2), 209–226.
- [22] Wetterneck, Chad T., et al. "A New Scrupulosity Scale for the Dimensional Obsessive-Compulsive Scale (DOCS): Validation With Clinical and Nonclinical Samples." *Behavior therapy* 52.6 (2021): 1449-1463.
- [23] Williams, M. T., Farris, S. G., Turkheimer, E., Pinto, A., Ozanick, K., Franklin, M. E., Liebowitz, M., Simpson, H. B., & Foa, E. B. (2011). Myth of the pure obsessional type in obsessive-compulsive disorder. *Depression and Anxiety*, 28, 495-500.
- [24] Williams, M. T., Mugno, B., Franklin, M., & Faber, S. (2013). Symptom dimensions in obsessive-compulsive disorder: Phenomenology and treatment outcomes with exposure and ritual prevention. *Psychopathology*, 46(6), 365–376.
- [25] Merissa, M., & Richard, R. (2020). Antecedent dari brand evangelism terhadap aspek focal dan rival brand; studi kasus pada fans klub sepak bola Manchester United (Doctoral dissertation, Universitas Pelita Harapan).
- [26] Beyaz, R., & GÜNGÖR, A. Y. (2021). The branding process: mediator roles of brand satisfaction and brand loyalty. *Kafkas Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 12(23), 322-346.

Efficiency Assessment of Tunisian Thermal Power Plants using Two-stage Double Bootstrap Data Envelopment Analysis

Meriam Belgaroui

(Corresponding author)

Higher School of Economic and Commercial Sciences of Tunis, University of Tunis

Larime Laboratory, ESSECT, Tunisia

E-mail : meriambelgaroui2012@gmail.com

Olfa Kammoun

Higher School of Economic and Commercial Sciences of Tunis, University of Tunis

Larime Laboratory, ESSECT, Tunisia

E-mail : olfakammoun@yahoo.fr

Abstract—This study examines the technical efficiency of Tunisian thermal power plants (TPPs) over the period 2005-2013 using a two-stage double bootstrap method proposed by *Simar and Wilson (2007)* to address bias and serial correlation in efficiency scores. In the first stage, bootstrapped DEA is used to compute technical efficiency (TE) scores, followed by bootstrapped truncated maximum likelihood in the second stage. Our analysis shows that power plants are significantly less efficient than initial DEA estimates suggest, with a notable decline in technical efficiency over the sample period, possibly exacerbated by the 2010 revolution crisis. Finally, the results allow us to identify benchmark TPPs, providing a target for inefficient TPPs seeking to improve their efficiency through determinant variables.

Keywords: Technical efficiency, data envelopment analysis (DEA), double bootstrap, thermal power plants, Tunisia.

I. INTRODUCTION

Electricity plays an essential role in today's society, forming the backbone of a nation. In 2008, rising energy prices continued to be a global concern, putting significant pressure on the management of power generation, particularly thermal power plants. The main challenge for these plants is fuel supply. With limited domestic energy resources, Tunisia relies on imported fossil fuels to meet its energy needs. In 2024, 86% of electricity is generated mainly by burning fossil fuels in thermal power plants ITA [4]. This heavy dependence underscores the urgent need for strategic diversification and sustainable energy solutions to strengthen Tunisia's energy security and economic resilience. A critical first step is to measure the technical efficiency of Tunisia's TPPs and identify potential efficiency drivers. The results of such assessments can provide the basis for informed policy recommendations and refinement of management strategies within Tunisia's energy sector.

Despite its widespread use in evaluating thermal power plant efficiency, many researchers have overlooked the deterministic nature of the DEA methodology, making it difficult to draw statistical conclusions from traditional DEA efficiency scores Ananda et al. [1]. Furthermore, regression analysis cannot be performed to investigate the

determinants of previously estimated scores Ananda et al. [2]. In addition, traditional DEA models do not account for data variability in efficiency scores, which undermines the robustness and reliability of the results. To address these shortcomings, Simar and Wilson [10] introduced a double bootstrap DEA methodology that aims to improve the robustness of estimation and statistical analysis in DEA applications.

Therefore, this study makes two contributions to the existing literature. First, it conducts the first empirical analysis specifically aimed at assessing the technical efficiency of Tunisian thermal power plants and identifying the factors influencing their TE. Second, from a methodological perspective, we introduce the two-stage bootstrap approach proposed by Simar and Wilson (2007). This method enhances the robustness of inference by accounting for bias and serial correlation in efficiency estimates, thus ensuring the validity of conclusions Simar and Wilson

The remainder of the paper is organized as follows: The study begins with a brief literature review. Section 2 presents the methodology. Section 3 discusses the empirical results and finally, Section 4 provides concluding remarks.

II. LITERATURE REVIEW

Academic research on thermal power plant efficiency often relies on Data Envelopment Analysis (DEA) as a prominent method for efficiency measurement. Compared to stochastic frontier analysis, DEA has the advantage of computing results without requiring prior knowledge of the specific form of the production frontier. Sarica and Or [5] use DEA to assess the operational efficiency of 65 Turkish power plants. Their results indicate that environmental costs are detrimental to efficiency. In their comparative analysis of the performance efficiency of US CFPPs, Sueyoshi et al. [12] find that those located in regulated states have higher energy levels. They suggest that this regulatory environment promotes efficient long-term operation and contributes to a stable electricity supply. Shrivastava et al. [6] estimate the TE of 60 coal-fired power plants (CFPPs) and examine the relationship between plant size and efficiency. Their results show small plants are less efficient than medium and large. Zhou et al. [13] study the EE of China's power industry using a two-stage approach. In the first stage, they integrate the slack-based measurement method, followed by Tobit regression analysis in the second stage. Their research highlights a positive correlation between environmental efficiency and three uncontrollable factors: firms' innovation capability, coal power share, and generation capacity. Song et al. [14] analyzes the energy efficiency of 34 coal-fired power plants in China. Their study examines the relationship between energy efficiency and various uncontrollable factors, including coal quality, load factor, capacity factor, main steam parameters, and cooling method.

While studies using the DEA approach with the two-stage DEA model are valuable for identifying the determinants of thermal power plant efficiency, they have notable limitations. First, they rely on the deterministic DEA method, which is inherently biased and sensitive to sampling variation in the frontier obtained Simar & Wilson [7]. The efficiency scores of this method show strong statistical dependence by Simar and Wilson [8,9], which makes their use in second-stage regressions problematic because they violate the assumptions required by the regression model. Second, some studies use censored models such as Tobit to examine the determinants of efficiency estimates. However, according to Simar and Wilson [10], DEA estimates used in second-stage analyses are biased and serially correlated, rendering standard inference methods invalid for second-stage regressions. These limitations underscore the need for caution in interpreting the results of such studies.

Based on the literature review, no previous research has examined the efficiency of thermal power plants in Tunisia. This study employs a two-stage double bootstrapping DEA procedure to identify the determinants affecting the efficiency of TPPs in Tunisia. This effort is crucial to identify potential sources of inefficiency and assist policymakers in formulating regulations and designing future policies.

III. THE MODELING APPROACH

As explained above, we apply the method of Simar and Wilson [10] in a two-step procedure. In the first step, we use Data Envelopment Analysis (DEA) to estimate the technical efficiency of TPPs and identify the most efficient ones; in the second step, we use truncated regression estimation with double bootstrap to test the significance of the explanatory variables on TE. In DEA analysis, we should choose the orientation (input or output) and the type of returns to scale. About the orientation, we use an input-oriented model. For the returns to scale, we use variable returns to scale (VRS) proposed by Banker et al. 1984 because the TPPs used in our analysis have different sizes.

Flowing the methodology outlined by Essid, et al. [4], we assume that $DMU_j = j = 1, \dots, n$ transforms an input vector $X = (x_{1j} \dots x_{mj})^m$ into an output vector $Y = (y_{1j} \dots y_{sj})^s$, DMU_j is one of the n DMUs being evaluated, the DEA estimator is then:

$$\begin{aligned} & \min \theta \\ & \text{s.t.} \\ & \sum_{j=1}^n \lambda_j x_{ij} \leq \theta x_{i0}, \quad i = 1, \dots, m \\ & \sum_{j=1}^n \lambda_j y_{kj} \geq y_{k0}, \quad k = 1, \dots, s \\ & \sum_{j=1}^n \lambda_j = 1 \end{aligned} \quad (1)$$

The objective function θ refers to the value of technical efficiency of TPP_j, which varies between [0,1]. A value of 1 indicates that a TPPs lies on the best practice frontier. λ_j represents the associated weighting of input and

output vectors of TPP_j. The restriction $\sum_{j=1}^n \lambda_j = 1$ imposes VRS assumption on the reference technology.

The second stage model is specified as a truncated regression:

$$\hat{\theta}_j = \beta Z_j + \varepsilon_j, \quad j = 1, \dots, n \quad (2)$$

This regression can be treated as the first-order approximation of the true unknown relationship between efficiency and its determinants. In Eq. (2), $\hat{\theta}_j$ represents the efficiency scores estimated in the first stage, $Z_j = (1, z_{1j}, z_{2j}, \dots, z_{rj})$ is the vector of explanatory variables that we expect to influence efficiency through the vector of parameters $\beta = (\beta_0, \beta_1, \dots, \beta_r)'$ and ε_j is a statistical noise. The bias corrected estimator $\hat{\theta}_j$ is replacing by its bias corrected estimate θ_j obtained using DEA with bootstrap incorporating an Eq. (2) given by:

$$\tilde{\theta}_j = \theta_j + \text{Bias}(\theta_j), \quad j = 1, 2, \dots, n \quad (3)$$

Where, $\text{Bias}(\theta_j)$ is the term bootstrap bias, the term bootstrap bias represents the bias and may be estimated by the procedure as described in appendix.

In equation (3) we assume that $\theta_j \sim N(0, \sigma^2)$ such that $\theta_j \in [0, 1]$, $j = 1, \dots, n$ in order to take into account the right and left truncation issues. Because θ_j is censored at 0 and 1, we use a two-limit tobit model to explain DEA scores. This model assumes that there is a latent variable of interest, θ_j^* which is not fully observed. Instead of observing θ_j^* , we observe θ_j which is defined as follows:

$$\tilde{\theta}_j = \begin{cases} 0 & \text{if } \theta_j^* < 0 \\ \theta_j^* & \text{if } \theta_j^* \in [0, 1] \\ 1 & \text{if } \theta_j^* > 1 \end{cases} ; \quad \theta_j^* = \beta_j Z_j + \varepsilon_j \quad (4)$$

This model is then estimated using a maximum likelihood and the inference on coefficients is made on bootstrap incorporating the structure in Eq. (3). Confidence intervals can also be constructed for the model parameters (β_j, σ^2) with the bootstrap approach. For the estimation of this model, we follow Algorithm 2 of Simar and Wilson [10] described in Appendix.

IV. EMPIRICAL ANALYSIS

In this study, three inputs (number of employees, installed capacity, and fuel consumption) and one output (electricity generated) are used to measure TE. All data are collected from the "STEG Dispatching Office" for 18 TPPs over the period 2005-2013.

To find out the sources of TE, the bias-corrected efficiency will be regressed against the explanatory variables in truncated regression, The econometric model is denoted in Eq. (5).

$$\tilde{\theta}_j = \beta_0 + \beta_1 \text{age} + \beta_2 \text{asc} + \beta_3 \text{capacity} + \beta_4 \text{size} + \beta_5 \text{Time} + \varepsilon_j \quad (5)$$

$\tilde{\theta}_j$ is the estimated TE values based on the VRS assumption. Where AGE is the age of the TPPj at time t, ASC is the average specific fuel consumption of the TPPj at time t, CAPACITY is the capacity factor of the TPPj at time t, SIZE is a dummy variable equal to 0 for small TPPs and 1 for medium TPPs, and Time is a dummy variable representing the trend time of the sample period, equal to 0 for the period before 2010 and 1 for the period after 2010.

Table 1 shows the variation in efficiency scores among different thermal power plants (TPPs). The original DEA efficiency scores are shown in the second column, indicating that all TPPs are inefficient. The average technical efficiency score under Variable Returns to Scale (VRS) is 0.6374, suggesting that TPPs could maintain the same output performance with an average 36% reduction in inputs. We applied a DEA bootstrapping technique to improve the robustness of the results. The fourth column of Table 1 reports the results of the bias-corrected TE VRS, with confidence intervals (CIs) shown in the fifth and sixth columns. The bias-corrected TE scores have a lower mean than the initial scores, and none of the TPPs has a full technical efficiency score. The difference between the initial and bias-corrected efficiency scores is minimal (0.674 vs. 0.645).

Bias-corrected technical efficiencies show variation across units during the sample period. As shown in Figure 1, overall bias-corrected efficiencies declined during the 2008-2011 and 2011-2013 periods. In 2008, the average bias-corrected efficiency peaked at 0.702, suggesting a potential 30% increase in output for the same set of inputs. By 2010, this value dropped to 0.612, suggesting that TPPs struggled to maintain efficiency amid reforms and instability following the Tunisian revolution.

Table 1: Efficiency Scores: DEA, and Bootstrap DEA

| TPPs | DEA Scores | Biais Corrected | Biais |
|--------------|--------------|-----------------|--------------|
| Rades A | 1,000 | 0,960 | 0,040 |
| Rades B | 0,962 | 0,906 | 0,056 |
| Sousse B | 1,000 | 0,967 | 0,033 |
| SOUSSE CC | 1,000 | 0,967 | 0,033 |
| BIR MCHERGA | 0,681 | 0,669 | 0,012 |
| BOUCHEMMA 3 | 0,681 | 0,661 | 0,020 |
| SFAX TYNA | 0,881 | 0,810 | 0,071 |
| FERIANA | 0,891 | 0,814 | 0,077 |
| GOULETTE TG | 0,653 | 0,617 | 0,036 |
| GHANNOUCH | 0,531 | 0,512 | 0,019 |
| TUNIS SUD TG | 0,514 | 0,490 | 0,024 |
| BOUCHEMA 1/2 | 0,485 | 0,470 | 0,014 |
| SFAX GREMDA | 0,494 | 0,481 | 0,013 |
| MANZEL BOUR | 0,461 | 0,450 | 0,011 |
| KORBA TG | 0,613 | 0,570 | 0,044 |
| KASSERINE | 0,488 | 0,478 | 0,010 |
| ROBBANA | 0,435 | 0,419 | 0,015 |
| ZARZIS | 0,367 | 0,361 | 0,006 |
| Mean | 0,674 | 0,645 | 0,030 |
| Min | 0,367 | 0,361 | 0,006 |
| Max | 1,000 | 0,967 | 0,077 |
| Std.D | 0,222 | 0,208 | 0,021 |

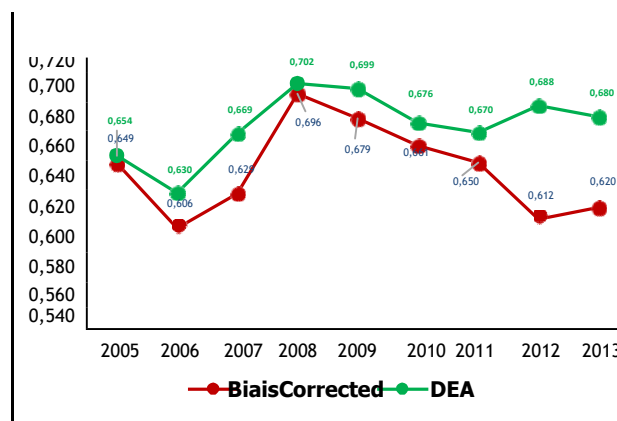


Fig. 1 The average efficiency scores DEA and Biais corrected over time

In the second step, the bias-corrected score of 18 TPPs over nine years was aggregated in a truncated regression as shown in equation (4). The results of the observed variables and standard errors are presented in columns 2 and 3 of Table 2, respectively. The estimates are in line with our initial expectations. The signs of the coefficients indicate the direction of inefficiency. As expected, the coefficients on AGE and ASC are significant factors (at the one percent level) that affect the environmental efficiency of TPPs.

Table 2: Truncated regression result

| Variables | Observed Coef. | Std. Err |
|-----------------|----------------|----------|
| <i>Age</i> | 0.0235*** | 0.0039 |
| <i>ASC</i> | -0.0014*** | 0.0005 |
| <i>Capacity</i> | 0.2711** | 0.0929 |
| <i>Size</i> | -0.5982** | -0.1248 |
| <i>Time</i> | -0.1195** | -0.3899 |
| <i>Consant</i> | 1.0089*** | 0.1773 |
| <i>Sigma</i> | 0.1630 | 0.0135 |

Several findings emerge from this analysis. First, the insignificance of the AGE coefficient suggests that age may not accurately capture technological progress or the experience of plant personnel. Conversely, there is strong statistical evidence that both the CAPACITY and SIZE coefficients significantly affect plant inefficiency, with larger capacity plants exhibiting greater efficiency due to economies of scale and consistent access to high-quality management skills. In addition, the significant ASC coefficient is in line with expectations, indicating that inefficiency increases with the amount of fuel consumed. Lower average specific consumption is crucial for improving efficiency and environmental performance. Finally, a declining trend in efficiency over the period can be attributed to growth constraints in internal markets and internal reforms.

V. CONCLUSION AND POLICY PERSPECTIVE

This study provides valuable insights into the factors influencing thermal power plant (TPP) efficiency. While age may not fully capture technological advances or staff experience, the significant impact of capacity and size underscores the importance of economies of scale and skilled management in improving plant efficiency. In

addition, the relationship between fuel consumption and inefficiency highlights the need to improve fuel utilization efficiency, which is critical for performance and environmental sustainability.

Policymakers should prioritize initiatives aimed at improving the efficiency and sustainability of TPPs. These include investments in technology and workforce training to optimize plant operations and promote the adoption of cleaner and more efficient fuel technologies. In addition, policies that support economies of scale and incentivize fuel efficiency improvements can contribute to overall plant performance and environmental protection. By implementing these policies and encouraging long-term planning and reform, policymakers can effectively address efficiency challenges and promote sustainable development in the thermal power sector.

REFERENCES:

- [1] Ananda, J 2018. Productivity implications of the water-energy-emissions nexus: An empirical analysis of the drinking water and wastewater sector. *J. Clean. Prod.* 196, 1097–1105.
- [2] Ananda, J 2019. Explaining the environmental efficiency of drinking water and wastewater utilities. *Sustain. Prod. Consum.* 17, 188–195.
- [3] Essid, Jebali, E., H., & Khraief, N. (2017). The analysis of energy efficiency of the Mediterranean countries: A two-stage double bootstrap DEA approach. *Energy*, 134, 991-1000.
- [4] ITA, 2024. International Trade Administration, "Electrical Power Systems and Renewable Energy Tunisia", <https://www.trade.gov/country-commercial-guides/tunisia-electrical-power-systems-and-renewable-energy> (Accessed: May 14, 2024).
- [5] Sarica, K., & Or, I. (2007). Efficiency assessment of Turkish power plants using data envelopment analysis. *Energy*, 32, 1484–1499.
- [6] Shrivastava, N., Sharma, S., & Chauhan, K. (2012). Efficiency assessment and benchmarking of thermal power plants in India. *Energy Policy*, 40, 159–176.
- [7] Simar, L., & Wilson, P. W. (1998). Sensitivity analysis of efficiency scores: How to Bootstrap in nonparametric frontier models. *Management Science*, 44(1), 49–61.
- [8] Simar, L., & Wilson, P. W. (1999). Estimating and bootstrapping Malmquist indices. *European Journal of Operational Research*, 115(3), 459–471.

[8] Simar, L., & Wilson, P. W. (2000). A general methodology for bootstrapping in non-parametric frontier models. *Journal of Applied Statistics*, 27(6), 779–802.

[9] Simar, L., & Wilson, P. W. (2007). Estimation and inference in two-stage, semi-parametric models of production processes. *Journal of econometrics*, 136(1), 31–64.

[10] Song, C., Li, M., Zhang, F., He, Y.-L., & Tao, W.-Q. (2015). A data envelopment analysis for energy efficiency of coal-fired power units in China. *Energy Conversion and Management*, 102, 121–130.

[11] Sueyoshi, T., Goto, M., & Ueno, T. (2010). Performance analysis of US coal-fired power plants by measuring three DEA efficiencies. *Energy Policy*, 38, 1675–1688.

[12] Zhou, Y., Xing, X., Fang, K., Liang, D., & Xu, C. (2013). Environmental efficiency analysis of power industry in China based on an entropy SBM model. *Energy Policy*, 57, 68–75.

Appendix: Algorithm 2 of Simar and Wilson 2007

1. Estimate the energy efficiency scores, θ_j , for all TPPs in the sample using input-oriented DEA model with VRS technology (Banker et al. [19]).
2. Carry out a truncated maximum likelihood estimation to regress energy efficiency scores against a set of explanatory variables b_j , $\theta_j = b_j\beta + \varepsilon_j$, and provide an estimate $\hat{\beta}$ of the coefficient vector β and estimate σ_s of σ_s , the standard deviation of the residual errors ε_j .
3. For each TPP, j ($j = 1, \dots, N$), repeat the following four steps (3.1–3.4) Z_1 times to obtain a set of Z_1 bootstrap estimates θ_z for $z = 1, \dots, Z_1$.

Generate the residual error, ε_j , from the normal distribution $N(0, \theta)$. s

3.2 Compute $\theta_j^* = b_j\hat{\beta} + \beta$.

Generate a pseudo data set (x^*, y^*) where $y_j = y_j \left(\frac{\theta_z}{\theta_j^*} \right)$.

Using the pseudo data set (x^*, y^*) and DEA VRS, calculate the pseudo efficiency estimates θ^* . j

4. Calculate the bias-corrected estimator, $\hat{\theta}_j$, for each TPP, j ($j = 1, \dots, N$), using the bootstrap estimator or the bias z , where $\hat{\theta}_j = \theta_j - z$ and $z = \left(\frac{1}{Z_1} \sum_{z=1}^{Z_1} \theta_j^* \right) - \theta_j$.
5. Use the truncated maximum likelihood estimation to regress $\hat{\theta}_j$ on the explanatory variables, b_j , and provide an estimate $\hat{\beta}$ for β and an estimate σ for σ_s .
6. Repeat the following three steps (6.1–6.3) Z_2 times to obtain a set of Z_2 pairs of bootstrap estimates $(\hat{\beta}_j^*, \sigma^*)$ for $z = 1, \dots, Z_2$.

Generate the residual error ε_j from the normal distribution $N(0, \theta)$. s

6.2 Calculate $\theta_j^{**} = b_j\hat{\beta}^* + \varepsilon_j$.

6.3 Use the truncated maximum likelihood estimation to regress θ_j^{**} on the explanatory variables, b_j , and provide an estimate $\hat{\beta}_j^*$ for β and an estimate σ^* for σ_s .

7. Construct the estimated $(1 - \alpha)\%$ confidence interval of the n -th element, β_n of the vector β , that is, $[Lower_{\beta_n}, upper_{\beta_n}] = [\hat{\beta}_n - a_{\beta_n}, \hat{\beta}_n + b_{\beta_n}]$ with $\Pr ob(\hat{\beta}_n - a_{\beta_n} \leq \beta_n \leq \hat{\beta}_n + b_{\beta_n}) = 1 - \alpha$.

The Role of Personality in Consumer Animosity

Rania Essouei^{#1}, Nedra Bahri Ammari^{#2}

IHEC Carthage, Tunis, Tunisia

¹r.essouei@gmail.com

²Nedra.bahri.ammari@ihec.ucar.tn

Abstract— Consumer animosity is defined as the hostility towards the products of a specific country. In this study, we seek to know whether having certain personality traits favors this type of attitude. Concretely, we will examine the effect of every single variable of the Big five on consumer animosity and purchase intention. This study is not completed yet, we are still in the data collection stage and none of the sections are one-hundred percent done. The data is being gathered through a questionnaire. It will be collected in two countries, Tunisia and Algeria, which will allow us to compare the data later on to provide more useful information for French companies that wish to expand their activities in one or both of these North African countries.

Keywords— Consumer animosity; personality traits; Big Five; purchase intention; quantitative research.

I. INTRODUCTION

The impact of a product's origin on assumptions made about the product have traditionally been the focus of study on the purchasing of foreign products. According to the literature, consumers' judgments of a product are influenced by country-of-origin information. Recent studies, on the other hand, have focused on the broader implications of a product's origin. Consumer ethnocentrism and consumer animosity are two of these factors [5]. Consumer animosity is defined as “*the remnants of antipathy related to previous or ongoing military, political or economic events*” [9]. In other words, it is “*consumers' hostility toward a specific country's products*” [17]. Consumer animosity differs from consumer ethnocentrism. In the latter, consumers favor domestic products and have negative quality perceptions of foreign products. Meanwhile, consumer animosity occurs when consumers are hostile to products from a specific country despite having clear information about product quality and having little or no problem using foreign-based products. Consumers refuse to buy things made in that specific country but may buy products made in other countries [8].

Nijssen and Douglas [20] investigated Dutch customers' attitudes toward German products and found that animosity toward a specific country is a significant factor in influencing purchasing decisions for products from that country. Klein [8] found similar results in his study of American attitudes toward Japanese products, Hinck [19] in his study of the failure of eastern German products in western Germany, Pisani [22] in his study of domestic animosity toward Mexican and Guatemalan products in Belize, and Ettenson and Klein [21] in their study of Australian attitudes toward French products. Hence we suggest the hypothesis:

H1: animosity has a negative effect on purchase intention.

Personality has an impact on consumer animosity [18], [10]. The Big Five/Five Factor Model is the most widely used personality taxonomy, which divides a wide range of personality traits into five dimensions: agreeableness, extraversion, conscientiousness, neuroticism, and openness. The degree to which someone is gregarious, active and outgoing is referred to as extraversion [13]. Extraversion has two aspects: enthusiasm and assertiveness [3]. The latter means being a leader and an influencer. Enthusiasm, on the other hand, means being good at making friends and getting close to them, and it also means having a lot of fun and showing it. Extraverts are known for their optimism, friendliness, gregariousness, and desire for adventure. Introverts, on the other hand, are quiet, reserved, and silent people who find social gatherings taxing [12]. Conscientiousness is defined as a person's predisposition to be structured, responsible, and dependable, as well as to exercise self-control, follow rules and conventions, and take their responsibilities to others seriously [13]. It has two aspects: industriousness and orderliness [3]. Industriousness means being quick and efficient, while orderliness means being tidy and having rules and routine. An individual's tendency to suffer unpleasant emotional effects such as worry, aggravation, and irritability is known as neuroticism [13]. It has two aspects: volatility and withdrawal [3]. Volatility means being moody and getting upset easily. Withdrawal means being easily anxious and depressed.

Neuroticism refers to a person's ability to deal with stressful situations in the future, as well as feelings of uneasiness and instability [6]. Neurotic persons are more worried and afraid in their lives, and their negativity lasts for an unusually long time [12]. They are also less likely to be accommodating in personal relationships with people from other groups, and they have trouble controlling stress and anxiety [1]. The breadth, depth, and variability of one's desire for new ideas are described by openness [7]. It refers to a person's ability to be open-minded, clever, and imaginative [13]. Although openness generally refers to a person's proclivity for cognitive exploration, it includes two key components: openness to experience (aesthetics and emotions) and openness to intellect (intellectual inclinations) [8]. Openness to intellect means being able at learning and dealing with information quickly and efficiently. It also means being good at expressing thoughts and also having intellectual curiosity. Individuals who are extremely open are characterized by artistic appreciation, originality, and unconventionality, and they think and act in nonconforming ways. They're also more open to new concepts, values, and behaviors. According to Leonidou et al. [10], extraversion and conscientiousness have a negative effect on consumer animosity, while neuroticism and openness are positively associated with animosity [10]. Thus, we can posit:

H2: Extraversion has a negative effect on consumer animosity

H3: Conscientiousness has a negative effect on consumer

animosity H4: Neuroticism has a positive effect on consumer

animosity

H5: Openness has a positive effect on consumer animosity

An individual's amount of empathy, warmth, and sympathy toward others is referred to as agreeableness [12]. Agreeableness has two aspects: compassion and politeness [3]. Compassion means having empathy and sympathy. Politeness is the opposite of being pushy and exploitative. It means being respectful and avoiding conflict. Individuals that are agreeable are typically kind, courteous, and soft-hearted [13]. They also have a more positive outlook on human nature and are willing to put their own interests aside for the sake of others [7]. Individuals who have a low level of agreeability, on the other hand, are less courteous, cooperative, and accommodating in their interpersonal relationships [4]. They also prioritize self-interest over getting along with others and are unconcerned about societal well-being. According to previous study, agreeableness is linked to universalism and benevolence values, which include anti-animosity traits like peacefulness, friendliness, and forgiveness [14], [16]. Indeed, agreeable people are less prejudiced and discriminatory against out-groups [15] and respond to different sorts of conflicts less destructively [11]. Hence:

H6: Agreeableness has a negative effect on consumer animosity.

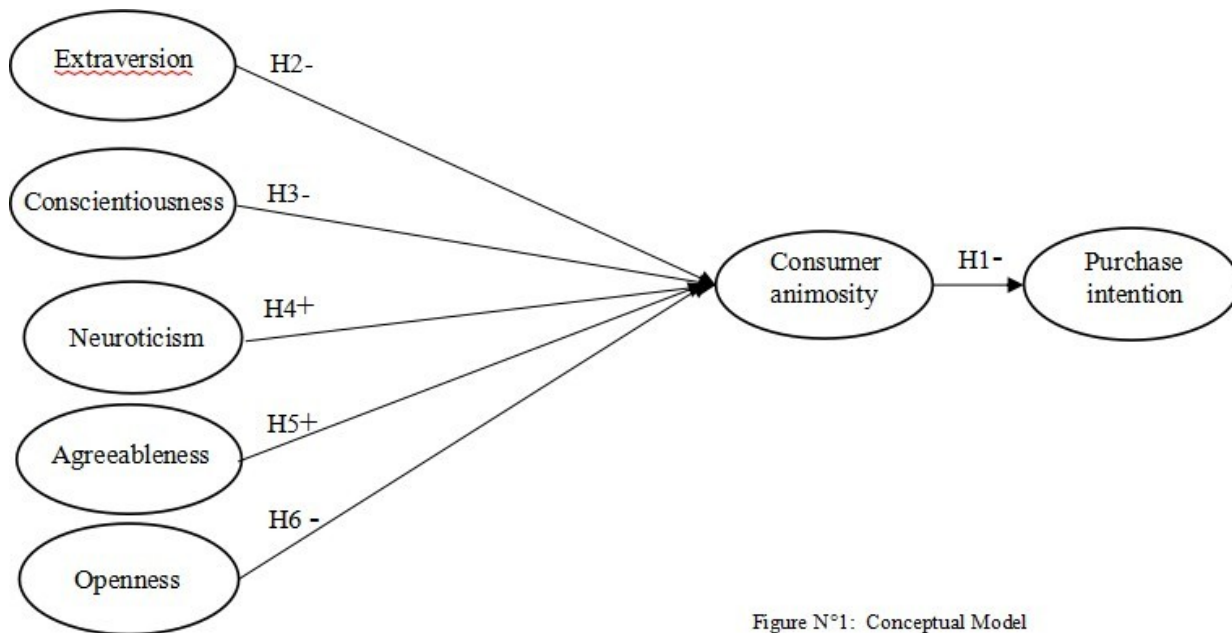


Figure N°1: Conceptual Model

[The hypothesis that evokes the comparison of the data between Tunisia and Algeria is still under development.]

The theories that uphold this research are: the social identity theory [23], the realistic conflict theory [24], the planned behaviour theory [25] and trait theory which was developed by Allport [26] and advanced by McCrae, Costa, and Busch [27]. According to the social identity theory, “the individual’s knowledge that he or she belongs to certain social groups, together with some emotional and value significance of this group membership to him or her” [28]. The realistic conflict theory stipulates that “negative images could arise as a result of intergroup conflicts of interest” [29]. According to the planned behaviour theory, attitudes precede behavioral intentions. Trait theory stipulates that «personality traits can affect individuals’ perceptions and behaviours» [30].

II. Methodology

The data will be collected through a survey. We will not take into account the answers of those who do not have the Tunisian and the Algerian nationality or those who have them both at the same time. The items were adopted from previous studies. There are two similar versions of the questionnaire, one for Algerians and one for Tunisians. This will allow the comparison of results later to provide information for French companies on which country they should choose first to sell their products. We only chose these two countries because they share important historical events that allow the questionnaire to be fairly identical in both countries and thus keep as much constant parameters as possible in the study to gain an objective perspective over the subject. The animosity scale was adapted to the context of these two countries (Table II), and the purchase intention scale will be too (See Table I) through a pilot study. The latter will allow us to pick the right French brand that should be available in both countries. There are 110 items in the questionnaire (Tables I and II). We will examine both the direct and indirect effects of each variable in the conceptual model. The non-probability convenience sampling method will be adopted. In the data analysis, Exploratory Factor Analyzes will be used to purify the scales, Multiple Linear Regressions will be used to test the effect of personality dimensions on animosity, a Simple Linear Regression will be applied to test H1, and lastly an Analysis of Variances will allow the comparison of the two countries.

Table I

The List of Items

| Items | Dimensions | | Scale | |
|---|--------------------|--------------------------------|--------------------------------|---------------|
| I dislike the french | Consumer animosity | | Consumer animosity [9] | |
| I feel angry towards the french | | | | |
| I will never forgive France for the Sakiet Sidi Youssef events | | | | |
| France should pay for what it did to Tunisians in the Sakiet Sidi Youssef events | | | | |
| France is not a reliable trading partner. | | | | |
| France wants to gain economic power over Tunisia | | | | |
| France is taking advantage of Tunisia | | | | |
| France has too much economic influence in Tunisia and Algeria | | | | |
| The French are doing business unfairly with Tunisia | | | | |
| If you had to buy a product, can you indicate what the probability would be of your buying a product from [Brand name]? | Purchase intention | | Purchase intention scale [2] | |
| Get angry easily | Volatility | Neuroticism | The Big Five Aspect Scales [3] | |
| Rarely get irritated. (R) | | | | |
| Get upset easily. | | | | |
| Keep my emotions under control. (R) | | | | |
| Change my mood a lot. | | | | |
| Rarely lose my composure. (R) | | | | |
| Am a person whose moods go up and down easily. | | | | |
| Am not easily annoyed. | | | | |
| Get easily agitated. | | | | |
| Can be stirred up easily | | | | |
| Seldom feel blue. (R) | Withdrawal | The Big Five Aspect Scales [3] | | |
| Am filled with doubts about things. | | | | |
| Feel comfortable with myself. (R) | | | | |
| Feel threatened easily. | | | | |
| Rarely feel depressed. (R) | | | | |
| Worry about things. | | | | |
| Am easily discouraged. | | | | |
| Am not embarrassed easily. (R) | | | | |
| Become overwhelmed by events. | Compassion | | | Agreeableness |
| Am afraid of many things. | | | | |
| Am not interested in other people's problems. (R) | | | | |
| Feel others' emotions. | | | | |
| Inquire about others' well-being. | | | | |
| Can't be bothered with other's needs. (R) | | | | |
| Sympathize with others' feelings. | | | | |
| Am indifferent to the feelings of others. (R) | | | | |
| Take an interest in other people's lives. | | | | |
| Take no time for others. (R) | | | | |
| Don't have a soft side. (R) | Politeness | | The Big Five Aspect Scales [3] | |
| Like to do things for others. | | | | |
| Respect authority. | | | | |
| Insult people. (R) | | | | |
| Hate to seem pushy. | | | | |
| Believe that I am better than others. (R) | | | | |
| Avoid imposing my will on others. | | | | |

| | | | | | |
|---|-----------------|-------------------|---------------|--|--|
| Rarely put people under pressure. | | | | | |
| Take advantage of others. (R) | | | | | |
| Seek conflict. (R) | | | | | |
| Love a good fight. (R) | | | | | |
| Am out for my own personal gain. (R) | | | | | |
| Carry out my plans. | Industriousness | Conscientiousness | | | |
| Waste my time. (R) | | | | | |
| Find it difficult to get down to work. (R) | | | | | |
| Mess things up. (R) | | | | | |
| Finish what I start. | | | | | |
| Don't put my mind on the task at hand. (R) | | | | | |
| Get things done quickly. | | | | | |
| Always know what I am doing. | | | | | |
| Postpone decisions. (R) | | | | | |
| Am easily distracted. (R) | | | | | |
| Leave my belongings around. (R) . | | | Orderliness | | |
| Like order. | | | | | |
| Keep things tidy. | | | | | |
| Follow a schedule. | | | | | |
| Am not bothered by messy people. (R) | | | | | |
| Want everything to be "just right." | | | | | |
| Am not bothered by disorder. (R) | | | | | |
| Dislike routine. (R) | | | | | |
| See that rules are observed. | | | | | |
| Want every detail taken care of. | | | | | |
| Make friends easily. | Enthusiasm | Extraversion | | | |
| Am hard to get to know. (R) | | | | | |
| Keep others at a distance. (R) | | | | | |
| Reveal little about myself. (R) | | | | | |
| Warm up quickly to others. | | | | | |
| Rarely get caught up in the excitement. (R) | | | | | |
| Am not a very enthusiastic person. (R) | | | | | |
| Show my feelings when I'm happy. | | | | | |
| Have a lot of fun. | | | | | |
| Laugh a lot. | | | | | |
| Take charge. | | | Assertiveness | | |
| Have a strong personality. | | | | | |
| Lack the talent for influencing people. (R) | | | | | |
| Know how to captivate people. | | | | | |
| Wait for others to lead the way. (R) | | | | | |
| See myself as a good leader. | | | | | |
| Can talk others into doing things. | | | | | |
| Hold back my opinions. (R) | | | | | |
| Am the first to act. | | | | | |
| Do not have an assertive personality. (R) | | | | | |
| Am quick to understand things. | Intellect | Openness | | | |
| Have difficulty understanding abstract ideas. (R) | | | | | |
| Can handle a lot of information. | | | | | |
| Like to solve complex problems. | | | | | |
| Avoid philosophical discussions. (R) | | | | | |
| Avoid difficult reading material. (R) | | | | | |
| Have a rich vocabulary. | | | | | |
| Think quickly. | | | | | |
| Learn things slowly. (R) | | | | | |
| Formulate ideas clearly. | | | | | |
| Enjoy the beauty of nature. | | | Openness | | |

| | | | |
|--|--|--|--|
| Believe in the importance of art. | | | |
| Love to reflect on things. | | | |
| Get deeply immersed in music. | | | |
| Do not like poetry. (R) | | | |
| See beauty in things that others might not notice. | | | |
| Need a creative outlet. | | | |
| Seldom get lost in thought. (R) | | | |
| Seldom daydream. (R) | | | |
| Seldom notice the emotional aspects of paintings and pictures. (R) | | | |

(R) indicates items to be reverse scored.

Table II

The Adapted Scale of Consumer Animosity

| The Original scale [9] | The adapted scale in this study |
|--|---|
| I dislike the Japanese. | I dislike the French |
| I feel angry toward the Japanese. | I feel angry towards the French |
| I will never forgive Japan for the Nanjing Massacre. | I will never forgive France for the Sakiet Sidi Youssef events** |
| Japan should pay for what it did to Nanjing during the occupation. | France should pay for what it did to Tunisians* in the Sakiet Sidi Youssef events** |
| Japan is not a reliable trading partner. | France is not a reliable trading partner. |
| Japan wants to gain economic power over China. | France wants to gain economic power over Tunisia* |
| Japan is taking advantage of China. | France is taking advantage of Tunisia* |
| Japan has too much economic influence in China. | France has too much economic influence in Tunisia* |
| The Japanese are doing business unfairly with China. | The French are doing business unfairly with Tunisia* |

*The words “Tunisia” and “Tunisian” in this questionnaire were replaced by “Algeria” and “Algerian” in the Algerian version.

**The Sakiet Sidi Youssef events were chosen because the victims were both Tunisians and Algerians. Both countries commemorate the martyrs together to this day.

Bibliography

- [1] Caligiuri, Paula, and Ibraiz Tarique (2012), "Dynamic Cross-Cultural Competencies and Global Leadership Effectiveness, *Journal of World Business*,"47 (4), 612-622.
- [2] De la Paz Toldos-Romero, María, and Ma Margarita Orozco-Gómez (2015), "Brand personality and purchase intention." *European Business Review* .
- [3] DeYoung, Colin G., Lena C. Quilty, and Jordan B. Peterson (2007), "Between facets and domains: 10 aspects of the Big Five." *Journal of personality and social psychology* 93.5: 880.
- [4] Doucet, Lorna, Bo Shao, Lu Wang, and Greg Oldham (2015), "I Know How You Feel, but It Does Not Always Help: Integrating Emotion Recognition, Agreeableness, and Cognitive Ability in a Compensatory Model of Service Performance" *Journal of Service Management*, 27 (3), 1-42.
- [5] Fernández-Ferrín, P., Bande-Vilela, B., Klein, J. G., & del Río-Araújo, M. L. (2015). "Consumer ethnocentrism and consumer animosity: antecedents and consequences". *International Journal of Emerging Markets*, 10(1), 73–88.
- [6] Herold, David M., Walter Davis, Donald B. Fedor, and Charles K. Parsons (2002), "Dispositional Influences on Transfer of Learning in Multistage Training Programs". *Personnel Psychology*, 55 (4), 851-869.
- [7] John, Oliver P., and Sanjay Srivastava (1999), "The Big Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives" In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and Research*, 102-138.
- [8] Klein, J.G. (2002), "US versus them, or US versus everyone? Delineating consumer aversion to foreign goods". *Journal of International Business Studies*, Vol. 33 No. 2, pp. 345-363
- [9] Klein, Jill Gabrielle, Richard Ettenson, and Marlene D. Morris (1998). "The animosity model of foreign product purchase: An empirical test in the People's Republic of China". *Journal of marketing* 62.1: 89-100.
- [10] Leonidou, Leonidas C., et al. (2019), "Personality traits, consumer animosity, and foreign product avoidance: The moderating role of individual cultural characteristics". *Journal of International Marketing* 27.2: 76-96.
- [11] Martin-Raugh, Michelle, Harrison Kell, and Stephan Motowidlo (2016), "Prosocial Knowledge Mediates Effects of Agreeableness and Emotional Intelligence on Prosocial Behavior". *Personality and Individual Differences*, 90, 41-49.
- [12] McCrae, Robert R., and Oliver P. John (1992), "An introduction to the Five Factor Model and Its Applications". *Journal of Personality*, 60 (2), 175-216.
- [13] McCrae, Robert R., and Paul T. Costa (1985), "Comparison of EPI and Psychoticism Scales with Measures of the 5-Factor Model of Personality". *Personality and Individual Differences*, 6, 587-597
- [14] Olver, James M., and Todd A. Mooradian (2003), "Personality Traits and Personal Values: A Conceptual and Empirical Integration". *Personality and Individual Differences*, 35 (1), 109-125.
- [15] Pratto, Felicia, James Sidanius, Lisa M. Stallworth, and Bertram F. Malle (1994), "Social Dominance Orientation: A Personality Variable Predicting Social and Political Attitudes" *Journal of Personality and Social Psychology*, 67 (4), 741-763.
- [16] Roccas, Sonia, Lilach Sagiv, Shalom H. Schwartz, and Ariel Knafo (2002), "The Big Five Personality Factors and Personal Values". *Personality and Social Psychology Bulletin*, 28 (6), 789-801.
- [17] Soylemez, Kemal Cem (2022). Consumer Animosity in Financial Markets. No. 7384. EasyChair,
- [18] TEDESCHI, PIERMARIO, and LULY DADUSC (2010), "Effects of Jewish-Italian consumer animosity towards Arab products: The role of personality". *Marketing Management* : 2.
- [19] Hinck, W., Cortes, A., & James, K. (2004). An empirical investigation of the failure of Eastern German products in !western German markets. *Journal for International Business and Entrepreneurship Development*, 2(1), 104-111.
- [20] Nijssen, E. J., & Dougl, S.P. (2004). Examining the animosity model in a country with a high level of foreign trade. *International Journal of Research in Marketing*, 21(1), 23-38.
- [21] Ettenson, R., & Gabrielle Klein, J. (2005). The fallout from French nuclear testing in the South Pacific: A longitudinal study of consumer boycotts. *International marketing review*, 22(2), 199-224.
- [22] Pisani, M.J. (in press). Importsaand Consumer ethnocentrism in Belize: Competing or complementary propositions? *Journal of Belizean Studies*.
- [23] Tajfel, H. and Turner, J.C. (1986), "The social identity theory of inter-group behavior", in Worchel, S. and Austin, L.W. (Eds), *Psychology of Intergroup Relations*, Nelson-Hall, Chicago, IL.
- [24] Sherif, M. (1966), In *Common Predicament: Social Psychology of Intergroup Conflict and Cooperation*, Houghton Mifflin, Boston, MA

11th International Conference On Business Economics, Marketing & Management Research (BEMM-2024)
Proceedings Book Series -PBS- Vol 10

- [25] Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- [26] Allport, G.W. (1937), *Personality: A Psychological Interpretation*, Holt, New York, NY.
- [27] McCrae, R. R., Costa, P. T., Jr., & Busch, C. M. (1986). Evaluating comprehensiveness in personality systems: The California Q-Set and the five-factor model. *Journal of Personality*, 54, 430-446.
- [28] Ku, Edward CS. "Distributed fascinating knowledge over an online travel community." *International Journal of Tourism Research* 16.1 (2014): 33-43.
- [29] Yan, Fengmin. *Image, reality and media construction*. Springer Singapore, 2020.
- [30] Yang, R., O'Connor, P., & Wibowo, S. (2024). Unpacking risk aversion and uncertainty avoidance: an analysis from a tourists' personality traits and information search perspective. *Tourism Recreation Research*, 1-21.

Evaluation of the Effectiveness of a Pharmaceutical IMS Based on Internal Dynamics of Knowledge Management

Faten MAAZOUN^{#1}, Karima BOUZGUENDA^{*2}
**PHD Student, Faculty of Economics and Management of Sfax
Airport Road Km 4, Sfax, 3018, Tunisia.
Email 1 - faten.maazoun@outlook.com*

*# Management Department, Faculty of Economics and Management of Sfax
Airport Road Km 4, Sfax, 3018, Tunisia.
Email 2 – karima.bouzuenda@fsegs.usf.tn*

Abstract— In our study we highlight the importance of cognitive and intangible resources within the pharmaceutical industry in Tunisia. By mobilizing contingency theory, our reflection aims to shed light on the integration of pharmaceutical Integrated Management Systems (IMS) and Knowledge Management (KM). This is an exploratory study, using an inductive approach. In this regard, semi-structured interviews were conducted with executives in pharmaceutical industries to propose a research model that focuses on the proposition relating to the contribution of KM to the effectiveness of a pharmaceutical IMS.

Keywords—Integrated Management System (IMS), Knowledge Management (KM), Qualitative Research, Pharmaceutical Industries.

I. INTRODUCTION

An overview of the main issues relating to pharmaceutical integrated management systems is understood based on both theoretical and practical findings.

On a practical level, promoting more investment in the pharmaceutical sector is also a priority for Tunisia and other economies in the Middle East and North Africa (MENA) region [1]. Strengthening the pharmaceutical sector could therefore support economic development, have a positive impact on public health, in particular by facilitating the fight against COVID-19, and more broadly the resilience of countries [1]. To this end, the pharmaceutical sector in the MENA region is expected to record annual growth of 10%, i.e. growth twice as fast as the global market [2]. In addition, the issue of drug production requires numerous strict regulations. It is an industry that produces in compliance with international quality standards [3].

In addition, the pharmaceutical industry generates and stores a lot of scientific, technical and commercial data. Therefore, the objective is to protect information throughout the research, development and production phases as well as to meet standards of the sector. The challenge is, then, to make knowledge management a daily task for employees.

On a theoretical level, research prospects in the field of drug safety and quality control of their production, sale and consumption remain relevant. This trend is directly related to the tightening of drug market conditions, the constant increase in consumer needs and other internal obstacles when implementing an integrated management system (IMS) ([4], [5], [6], [7]). As well, the scope of knowledge in a pharmaceutical laboratory extends from data to information. It is considered a product in its own right in the pharmaceutical industry [8].

The originality of this study lies in the fact that it explores the relationship between KM and the effectiveness of a pharmaceutical IMS in a Tunisian context while mobilizing the contingency theory [9]. In this regard, our approach is oriented towards the outline of a research model after an exploratory study of the field operationalizing the advanced problem and generating a set of propositions guiding the empirical research.

This study attempts to answer the following question: How does an internal KM dynamic contribute to the effectiveness of a pharmaceutical IMS?

II. THEORETICAL BACKGROUND

A. Integrated Management System (IMS)

The adaptation of structures to the environment is a condition for the survival and effectiveness of organizations by involving two concepts, namely differentiation and integration, which are at the heart of work on the theory of structural contingency [9]. Indeed, faced with the instability of the environment, pharmaceutical industries find it impossible to adopt homogeneous "one best way" behaviors, which will encourage them to adapt their organizational system according

to the variability of the environment, hence the differentiation. In addition, to remain effective and coherent, the latter must at the same time be managed by coordination and coherence mechanisms, hence the integration. An IMS truly combines the management system in an organization using the principles of employee orientation, process approach and system approach. It allows all management standards to be implemented and integrated, while operating as a single unit [10] [11].

In particular, an Integrated Management System (IMS) designates the integration of QSE systems which are as follows: an QMS Quality Management System (governed by the ISO 9001: 2015 standard [12]), an EMS Environmental Management System (governed by the ISO 14001: 2015 standard [13]) and an OHSMS Occupational Health and Safety Management System (according to the ISO 45001: 2018 standard [14]). Without forgetting, Good Manufacturing Practices (GMP) which determine the production, distribution and supply processes of a medicine [15].

From this point of view, it would be wise to point out that the aforementioned standards are all supported by the famous PDCA continuous improvement cycle, founded by Deming [15] ([16], [17]). Therefore, in this research we propose to distinguish the key success factors of a pharmaceutical IMS in the light of the PDCA philosophy. To this end, we discern:

- 1) *Planning Factors*: Inspired by the PLAN phase, such as: Need for sincere commitment and leadership from management ([18], [19], [20]).
- 2) *Achievement Factors*: Inspired by the DO phase, such as: Considering appropriate resources, communication and joint training throughout the company [21]. In addition, the good employee involvement in all functions [20]. And the establishment of an adequate process approach [22].
- 3) *Verification Factors*: Inspired by the CHECK phase, such as: Checking the validity of the results, measuring the performance of the IMS and verifying compliance with legal and normative requirements [23]. Likewise, carrying out internal and external audits ([24], [19], [20]).
- 4) *Improvement Factors*: Inspired by the ACT phase, such as: Continuous improvement as the glue that unites the IMS [19].

B. Knowledge Management

Knowledge creation can take various forms. According to Nonaka and Takeuchi [25], the interaction between tacit and explicit knowledge occurs through four basic knowledge creation processes: socialization, externalization, combination, and internalization (SECI).

- 1) *Socialization*: Learning occurs through observation, imitation and sharing of experiences [26]. It is the transition from tacit to tacit without resorting to language or codification.
- 2) *Externalization*: Formalization is realized through speech or writing of practices [26].
- 3) *Combination*: Always with the same source, it is done through a common language which allows the communication of explicit knowledge.
- 4) *Internalization*: Is the rooting of explicit knowledge [26].

As part of an IMS, each component generates a large amount of data and information [27]. In the same vein, the scope of knowledge in the pharmaceutical industries extends from data to information. It is considered a product in its own right [8]. Knowledge Management thus becomes a key element for aligning all the components of pharmaceutical IMS on a main objective. Moreover, intangible resources provide momentum in relation to organizational and environmental changes [28].

III. METHODOLOGY

This is an exploratory study based on a qualitative approach whose data collection tools are semi-structured interviews which are processed with the method of content analysis [29]. Semi-Structured interview guide is illustrated below in the Appendix A.

In this study we opted for content analysis as the most widespread method for studying interviews or qualitative observations [30] and as the method which tends to analyze the statements of the interviewees in the most objective possible, hence the most reliable. The procedure adopted is that of [31] which includes the transcription of the data, then their open coding based on the interview guide and the themes of the study and finally the semantic processing of the data carried out manually. It is based on an in-depth understanding of qualitative data, and which organizes a back and forth between the qualitative data collected and the analysis.

The sector studied is that of the pharmaceutical industries which ensure the development, manufacturing, and marketing of quality generic medicines in compliance with international standards, such as: GMP (Good Manufacturing Practices), ISO 9001:2015, ISO 45001 standards: 2018, ISO 14001: 2015. For this purpose, three semi-structured interviews were realized with managers of different specialties: Purchasing and Supply Manager, Quality Assurance Manager and QSE and Training Manager.

IV. FINDINGS

- 1) *The IMS: A variable geometry concept:* The explored research field confirms the empirical evidence of the contingency theory [9] adopted. It advocates the importance of aligning organizations with their environment (in our case are the legal and regulatory requirements and the export trends), as emphasized by one interviewee “the context of the pharmaceutical industry is effervescent, there is always news”; which encourages them to adapt their organizational system to the variability of the environment. This differentiation is based on a deep analysis of the problems encountered and the characteristics of organizations which do not have homogeneous behaviors or a unique and optimal “one best way” organizational system, as already asserted by one interviewee “The standard has not indicated an exact way of doing things, so everyone has their own approach”, which to remain effective, must at the same time be managed by effective IMS, hence the integration.
- 2) *KM: An embryonic concept:* The variability of the integrated management system is strongly linked to the perception of the concepts by the respondents. This divergence finds its essence in the relatively vague grasp of Knowledge Management. Indeed, the Background and the frame of reference of the respondents seem to be a key element to properly seize such a concept. It is clear at this level that there is a very remarkable divergence in the perception and application of knowledge management in these industries as it appears in the following verbatim: “It is an obligation: on a practical level it is not achieved in a suitable way” “we are obliged to have a schedule, authorization sheets, continuous evaluations. It remains to be seen whether they are practiced or not?”.
- 3) *Identification of major trends in the pharmaceutical industry:* Two major trends which characterize the external environment are noticed: There is a tendency among respondents to always refer to and align with the legal and regulatory requirements of the pharmaceutical sector. Indeed, they are, sometimes called “Obligations” and are always present. On the one hand, for the establishment and effectiveness of the IMS “*The first principle and requirement of ISO is compliance with legal and regulatory requirements*”, already announced in the theory ([32], [33], [34], [35]). On the other hand, for the establishment of knowledge management, one interviewee states that “*in relation to external knowledge, we have a document which is required by the inspectors of the Ministry of Public Health which is called the list of requirements*”.

The reliance on exporting presents itself as a widespread trend within the pharmaceutical industries which is achieved, according to their declarations, with the help of the implementation of the various ISO standards of the IMS: it is considered as “*An asset for companies which do export*” and “*We must start with GMP, then ISO standards to improve and move towards export*”.

- 4) *Factors influencing the effectiveness of pharmaceutical IMS:* Let's start with the fact that “*What is good at the ISO level is the notion of continuous improvement*” to examine the different factors highlighted by the interviewees and which are, in fact, distributed according to the four phases of the cycle PDCA, as illustrated below in the Table 1.

According to the findings, we underline the determining role of management commitment which results in a double effect: Firstly, good management commitment fuels the effectiveness of the IMS. As a primary planning factor (PLAN), respondents say that the top management fuels the delivery phase (DO) by ensuring that the necessary resources for the system are available (financial, human and infrastructure), which confirms the work of [36], and by encouraging the establishment of a “*good relationship*” with staff, thereby promoting their involvement.

Secondly, the intervention of top management in the Knowledge Management process is highlighted by our respondents: on the one hand, it plays an important role in the establishment of such a practice, perceived as a change within the system as accentuated by one interviewee “*In general, there is always resistance to change, but what has helped us is the commitment of the top management*”. On the other hand, it participates through the allocation of resources, a reflection which was shared by our respondents stating: “*The allocation of resources of course: If he (manager) was not from the start aware of the importance of organizational knowledge, he is not going to invest neither in a server, not in people and in training.*”.

In the same vein, the establishment of knowledge management is essentially the responsibility of the “Company’s Strategy” department. In addition, the top manager does participate in what we call “*belonging*”: “*I see that belonging has an important role in organizational knowledge. Belonging is based on: The relationship of trust between the latter and their colleagues and even with the manager*”. We can then highlight this fundamental and integrated role of the top management either in the established IMS or in the Knowledge Management process. The effectiveness of the IMS is, thus viewed, as a question of leadership.

TABLE I: INFLUENTIAL FACTORS THE EFFECTIVENESS OF A PHARMACEUTICAL IMS

| PDCA | Factors Mentioned | Confirmed Theory / Chapter(s) of ISO | Examples of Declarations |
|--------------|---|---|---|
| PLAN | Definition of the Business Context | 4.1. Understanding of the Organization and its Context. | <i>"Analysis of the company's context in terms of environment, safety and quality allows top management to establish and understand the context"</i> |
| | Risk and Opportunity Management | 6.1. Actions to Address Risks and Opportunities | |
| | Management Commitment and Leadership | ([23], [18], [19], [20]) 5.1. Leadership and Commitment | <i>"The system is a state of mind, and the first thing that must present itself is the management commitment ... the CEO always insists on ISO". "The good relationship"</i> |
| DO | Resource Availability | ([20], [21]) Resources | <i>"The allocation of resources of course: recruitment of people... he is not going to invest in a server, in people, in training." "After 5 years of experience, I see that communication and relationships represent 90% of the work." " Staff must be competent, this is through training and assessment"</i> |
| | Training | Competence 7.4. Communication | |
| | Traceability and Documentation | ([22], [23]) 7.5. Documented Information | <i>"The notion of documentation, the documentary pyramid (processes, procedures, instructions)" "Among the requirements of the GMP standard is traceability, similar to the ISO 9001 standard.", "Traceability must be ensured from receipt of the raw material until the last stage of distribution"</i> |
| | Process Approach | [22] 7.1.4. Environment for the Operation of Processes 7.2. Human Ressources 8.1. Operational Planning and Control | <i>"Process dispatching", "The principles of the quality standard facilitate the achievement of GMP requirements, such as the process approach, process mapping"</i> |
| | Quality Control | 8.7. Nonconforming Outputs | <i>"We can move from one stage to another if it is validated by quality control. The quality control phase is very important in the workshop because it is the basis. "</i> |
| | Employee Engagement | [20] Competence Sensitization | <i>Called "will of the staff" or "belonging". "Belonging is based on the motivation of the person, the selection of profiles from the start, the relationship of trust between the latter and their colleagues and even with the Upper management"</i> |
| CHECK | Audits (Internal, External, Suppliers) | ([19], [20]) | <i>"We understood that without audits and these events we cannot improve".</i> |
| | Evaluation (Staff, Training, Suppliers) | 9.1. Monitoring Measuring & Analysis Procedure | <i>Staff: "This is an indicator that deals with the assessment of staff", "Staff must be competent, it is through training and staff assessment, Training "this is the training evaluation sheet which includes the concepts acquired from the training and the track of applicability to the within the industry".</i> |
| ACT | Continuous Improvement | [19] 10.3. Continuous Improvement | <i>"What is good at the ISO level is the notion of continuous improvement"</i> |
| | Treatment of non-conformities | 10.2. Non-conformities and corrective action | <i>"In relation to the non-conformity sheets, it is necessary to make proof of the concerned defect, proof must be left, after the immediate actions, then the cause to put after the corrective actions."</i> |

At this level, it should be noted that staff involvement: sometimes called “*staff will*”, sometimes also “*membership*” is very crucial factor. Indeed, it is fueled by management commitment and the SECI process practices as argued by the interviewees. As a matter of fact, employees’ involvement is necessary in all functions and at all levels so that they are responsible and empowered to implement and maintain aspects of quality, environment, health and safety [37] “*It can even be the employee is the one who asks, who is curious*”.

We may advance that the effectiveness of the IMS is a matter of actors: We can affirm that there is a shared tendency among the interviewees who consider that these factors of realization, or of the DO stage, constitute the flagship element of the cycle of improvement.

Table 2. Dynamics Modes of Knowledge Conversion [25]

| SECI | Factors Mentioned | Examples of Declarations |
|------------------------|----------------------------------|---|
| Socialization | Supervision | “ <i>Supervision represents 50% of knowledge management. It depends on one manager to another: there are those who just want the work to be done and those who give their time</i> ” |
| | Culture | “ <i>Without audits we cannot improve because if everything is stable, people become stagnant and there we come back to the idea of culture.</i> ” |
| Externalization | Job Description | “ <i>Each function has its own job description, from the goalkeeper to the general manager</i> ” |
| | Traceability | “ <i>Each individual at the beginning requires training which is traced: that means when I explain something, it must be traced in the form.</i> ” “ <i>The quality document includes all the necessary information: what he is going to do from I to Z, even when he is going to use something.</i> ” |
| | Communication | “ <i>I see that communication and relationships represent 90% of the work.</i> ” |
| | Knowledge Transfer | “ <i>When we receive the marketing authorization, the development department will transfer the information</i> ” |
| Combination | Information System | “ <i>In the mastery of organizational knowledge, we find computer systems. They are very important...the IT system, which in turn ensures the retention of the organizational knowledge of the company.</i> ” |
| | Validation of Information System | “ <i>Validation of Information System ensures the reliability of information in the computer system... There is also data to be obtained from the system supplier</i> ” |
| | Internal networks | “ <i>Among the things that help us in organizational knowledge is the internal network</i> ” |
| | IT security | “ <i>We must ensure from the start that there is a basis of IT security and documentation which allows us that even if the person is no longer there, we continue to work...IT security is crucial.</i> ” |
| Internalization | Training | “ <i>Knowledge acquired through experience, either from everyday life or from training.</i> ”, “ <i>Each individual at the beginning requires training</i> ”. |

Based on the findings in table 2 above, we distinguish the predominance of certain attitudes of externalization, such as traceability, and of internalization such as training, more than others (socialization/combination). In this regard, it should be emphasized that the determinants expressed by the respondents for each stage of the SECI process mainly fall into the achievement phase. This correspondence, or recurrences, of the same factors leads us to review the phase of carrying out the PDCA cycle by integrating the SECI process. This integration can fuel and promote the progress of the “DO” phase, which in turn will have its motivating effect to run the PDCA cycle of continuous improvement in an innovative manner.

In addition, training and traceability embody two motivating practices which are cited doubly: As it is clearly mentioned at the level of the different standards (9001, 14001 and 45001) training and the notion of traceability are mentioned at the level of the achievement chapters (DO), which are strongly cited by our interviewees as implementation factors (DO) in the established IMS. In addition, as factors which are part of the SECI process: training refers to indicate internalization and traceability, strongly mentioned, for externalization.

We may then infer that the real issue is internal more than external. This interpretation is explained by the fact that the perception of the concept of knowledge management by managers remains vague, as well as the appropriation of its methods and tools. This allows us to return to the observation highlighted by [37] who states that the context of knowledge management is still in its infancy.

Moreover, the application of knowledge management is based on the behavioral orientations of either managers or staff. Indeed, among the key declarations on this subject we cite in relation to those in charge: “*Because it depends on one manager to another: we have several departments, but it depends on the head of each department*”. Regarding the staff: “*Generally, the younger ones are still motivated, they want to give. On the other hand, those who are elderly are in their comfort zone*” this is summed up by announcing that “*Having will is very important*”.

As a result, creating effective knowledge management often remains a critical task. This assertion is justified by the fact that measuring KM is not a simple mission due to its characteristics which include subjectivity, transferability, embeddedness, self-reinforcement, spontaneity, and ephemeral, which are all intangible [38]. The findings obtained offer some evidence that success in the market, in each context, finds its essence in elements such as key skills, human capital, capabilities, technological potential and intellectual capital available to the company [39]. All these elements are strongly linked to the knowledge accumulated in the company. Even more important is how to “manage” them, enrich them and benefit from them ([40], [41]). Knowledge management therefore remains a management matter eminently which represents an entire area of research.

V. CONCLUSION

As a conclusion, we may affirm that the adoption of knowledge management faces several barriers which inhibit its realization. Based on the inductive approach, we started from the proposition suggesting that the KM contributes to the effectiveness of the IMS, such proposition relies on the theoretical assertion that the predominance of often traditional forms of organization which favor a vertical hierarchical structure represents an obstacle to any initiative for change [42]. Besides, the certification process is intended to be a voluntary process much more than the result of normative, mimetic and/or coercive pressure.

These two relevant observations lead us to rethink the role that organizational change may have in not only promoting but also enacting the contribution of knowledge management to the effectiveness of a pharmaceutical IMS.

The present study presents some limitations that in turn come up with an opportunity for future research. It is interesting for further research to understand the role that organizational change can have in the relationship established between IMS and KM.

In a view to the fact that our research has the rather limited foundation of only two case studies, we recommend extending future research to a larger number of companies. Paying specific attention to size and cultural differences could also be of interest in this context.

REFERENCES

- [1] (2022) OECD website. [Online]. Available: <https://www.oecd.org/fr/pays/tunisie/etudes-economiques-de-l-ocde-tunisie-2022-69ef3240-fr.htm>.
- [2] (2019) IQVIA website. [Online]. Available: <https://www.iqvia.com/locations/middle-east-and-africa/library/presentations/mea-pharmaceutical-market-quarterly-report-edition-14>.
- [3] IPEMED. (2015). Available: http://www.ipemed.coop/adminIpemed/media/fich_article/1487264405_co-production-tunisia_v1.pdf.
- [4] M. Asif, A. M. Fisscher, O. Joost de Bruijn, and M. Pagell, “Integration of management systems: A methodology for operational excellence and strategic flexibility,” *Operations Management Research.*, vol.3, pp.146-160, 2010.
- [5] A. Simon, M. Bernardo, S. Karapetrovic, and M. Casadesús, “Integration of standardized environmental and quality management systems audits,” *Journal of Cleaner Production.*, vol. 19, pp. 2057-2065, 2011.
- [6] J. Abad, H.R. Cabrera, and A. Medina, “An analysis of the perceived difficulties arising during the process of integrating management systems,” *Journal of Industrial Engineering and Management.*, vol. 9, pp. 860-878, 2016.
- [7] M. Gianni, K. Gotzamani, and F. Vouzas, “Food integrated management systems: dairy industry insights,” *International Journal of Quality & Reliability Management.*, vol. 34, pp. 194-215, 2017.
- [8] J. Riddell and E. Goodman, *Knowledge Management in the Pharmaceutical Industry: Enhancing Research, Development and Manufacturing Performance*, Ashgate Publishing Limited, 2014.
- [9] P-R. Lawrence and J-W. Lorsch, “Organization and Environment: Managing Differentiation and Integration,” *Boston: Harvard Business School Press.*, 279 pages, 1967.
- [10] J. Veličković, J. Arsić, and M. Staletović, “The Integrated Management System in the bakery industri of Leskovac,” *Trendovi u poslovanju.*, vol. 8, pp. 44-54, 2020.
- [11] V. Zaloga, K. Dyadyura, I. Rybalka, and I. Pandova, “Implementation of Integrated Management System in order to enhance equipment efficiency,” *Management Systems in Production Engineering.*, vol. 27(4), pp. 221-226, 2019.
- [12] *Quality management systems — Requirements*, ISO 9001, 2015.
- [13] *Environmental management systems — Requirements with guidance for use*, ISO 14001, 2015.
- [14] *Occupational health and safety management systems — Requirements with guidance for use*, ISO 45001, 2018.
- [15] *Good Manufacturing Practices*, ANSM, 2023.
- [15] W.E. Deming, *Out of the Crisis*, MIT Press, Cambridge, MA, 1986.
- [16] O.J. De Oliveira, “Guidelines for the integration of certifiable management systems in industrial companies,” *J Clean Prod.*, vol. 57, pp. 124-33, 2013.
- [17] M. Bernardo, A. Simon, J. J. Tari, and J. F. Molina-Azorin, “Benefits of management systems View publication stats integration: A literature review,” *J. Clean. Prod.*, vol. 94, pp. 260–267, 2015.
- [18] D. Mackau, “SME integrated management system: a proposed experiences model,” *TQM Magazine.*, vol. 15, pp. 43-5, 2003.
- [19] J. Dubinski, E. Gruszka, E. Krodkiewska-Skoczylas, “Integrating Management Systems? No Problem for Pioneering Poles!” *ISO Management Systems*, pp. 43-50, January-February 2003.
- [20] A. Zutshi, and A.S. Sohal, “Integrated management system: the experiences of three Australian organisations,” *Journal of Manufacturing Technology Management.*, vol. 16 (2), pp. 211-232, 2005.
- [21] S.X. Zeng, J.J. Shi, and G.X. Lou, “A synergetic model for implementing an integrated management system: An empirical study in China,” *Journal of Cleaner Production.*, vol. 15, pp. 1760–1767, 2007.
- [22] H. Ubobov Serhii, V. Trokhymchuk Viktor, I. Todorova Violetta, and A. Zahorij Volodymyr, “Process Model of The Pharmaceutical Integrated Management System,” *Medical News.*, vol. 72(2), pp. 201-208, 2019.
- [23] A. Scipioni, F. Arena, M. Villa, and G. Saccarola, “Integration of management systems,” *Environmental Management and Health.*, vol. 12 (2), pp. 134-145, 2001.
- [24] M. McDonald, T.A. Mors, and A. Philips, “Management system integration: can it be done?,” *Quality Progress.*, vol. 36 (10), pp. 67-74, 2003.
- [25] I. Nonaka, and H. Takeuchi, “The knowledge-creating company. How Japanese companies create the dynamics of innovation,” *Oxford University Press*, Oxford, 1995.

11th International Conference On Business Economics, Marketing & Management Research (BEMM-2024)
Proceedings Book Series -PBS- Vol 10

- [26] J-Y. Prax, *Manuel de Knowledge Management Mettre en réseau les hommes et les savoirs pour créer de la valeur*, 4th ed., Management / Leadership, Ed. France: Dunod, 2019.
- [27] Z. Skuza, and R. Prusak, "Knowledge Management as a Component of Integrated Management Systems," *Multidisciplinary Aspects of Production Engineering.*, vol. 1 (1), pp. 515–20, 2018.
- [28] S-H. Tsen, H-L. Hu, "The research on the organizational competitiveness and intellectual capital indices of international tourist hotels," *Journal of Human Resource Management.*, vol. 10, 2010.
- [29] B. Berelson, "Content analysis in communication research," *Free Press*, 1952.
- [30] K. Krippendorff, *Content analysis: an introduction to its methodology*, 2nd Ed., Sage Publications, Thousand Oaks, CA, 2003.
- [31] B. Laurence, *L'analyse de Contenu*, 2nd Ed., Presses Universitaires de France, 2013.
- [32] S. Axley, "Communication change : question to consider," *Industrial Management.*, pp. 18-22, 2000.
- [33] A. Baklund, "The definition of system. In: Kybernetes," *Kybernetes*, vol. 29, no. 3, pp. 43-52, 2000.
- [34] P. López-Fresno, "Implementation of an integrated management system in an airline: a case study," *The TQM Journal.*, vol. 22, no. 6, pp. 629-647, 2010.
- [35] M.F. Rebelo, G. Santos, and R. Silva, "A generic model for integration of Quality, Environment and Safety Management Systems," *The TQM Journal.*, vol. 26, no. 2, pp. 143-159, 2014.
- [36] M. Musli, O. Mohd Rasid, Y., and I. Napsiah, "Strategies and critical success factors for integrated management systems implementation," *Total Quality Management and Business Excellence*, January 2005.
- [37] H. Zaim, E. Tatoglu, and S. Zaim, "Performance of knowledge management practices: A causal analysis," *Journal of Knowledge Management.*, vol. 11, no. 6, pp. 54-67, October. 2007.
- [38] J. Kluge, W. Stein, T. Licht, A. Bendler, J. Elzenheimer, S. Hauschild, U. Heckert, J. Jan Krönig , and A. Stoffels, "Why knowledge is important," in : *Knowledge Unplugged*, London : Palgrave Macmillan, 2001, pp. 2-23.
- [39] W. Walczak, "Analiza czynników wpływających na konkurencyjność przedsiębiorstw," *e-mentor.*, vol. 5, no. 37, 2010.
- [40] (2005) OECD website. [Online]. Available: <https://www.oecd.org/about/34711139.pdf>.
- [41] J-Y. Prax, *Le manuel du knowledge management Une approche de la 2ème generation*, Ed. France : Dunod, 2003.
- [42] O. Ben Fadhel, "L'impact socio organisationnel des nouvelles technologies de l'information et de la communication," Mémoire DEA, FSEG, Sfax, Tunisie, 2002.

APPENDIX A:
SEMI-STRUCTURED INTERVIEW GUIDE

A. Integrated Management System (IMS)

- First, we need to know about the lab's strategy (mission, strategic axes, values, vision, objectives)
- When did you set up the IMS?
- What are the internal factors behind this decision? (Can you rank these factors in order of importance?)
- What are the external factors? (Can you rank these factors in order of importance?)
- What were the internal and external issues? (Can you rank these factors in order of importance?)
- What was the process (How did you do it)?

B. Knowledge Management

- In your opinion, why has the new standard introduced knowledge management as fundamental to an IMS?
- What is its importance for your quality approach? (Can you give a rating from 1 to 7)
- How did you go about integrating knowledge management into your system? (actions, procedures, rules of conduct, training and skills development, creation of a dedicated service, communication, use of specialists...)
- What are the factors that favored the integration of KM into the IMS? (Can you rank these factors in order of importance?)
- What are the difficulties of such integration? (Can you rank these difficulties in order of importance?)
- What are the tangible results of this integration?
- What are the intangible results?
- What is its contribution of KM to the effectiveness of the IMS?
- Who are the people (internal and external) who participated in the effectiveness of the SMI? (Can you rank these actors in order of importance?)

WHAT MOTIVATE SOCIAL MAVENS AS MICRO-INFLUENCERS TO CREATE BRAND RELATED CONTENT IN INSTAGRAM? AN INSTANOGRAPHY APPROACH

WIFEK ABDELKAFI

MARKETING DEPARTMENT; FSEG-SFAX

abdelkafiwifek@yahoo.fr

NIBRASS HADJTAIEB ELAOU

MARKETING DEPARTMENT; IHEC-SFAX

nibrass65@yahoo.fr

Abstract-The present research is an exploratory study by which, we attempt to understand what motivate social mavens as micro-influencers to create brand related content in Instagram. Being savvy and market experts, the social mavens are highly engaged in branded content creation. The goal of our study is to explore the determinants of maven generated brand content, through the lens of Instagram influencers.

Data were collected from Tunisian instagram micro-influencers, using a new qualitative approach, coined Instanography and analyzed using Nvivo software. Findings suggest that social mavens create posts about products and brands to fulfill content-related factors. This study contributes to the influence theory and draws an original qualitative technique in the digital marketing era.

Keywords-social maven, micro-influencer, instagram, branded content, Instanography

I. INTRODUCTION

The advent of digital platforms in emerging countries, such as Tunisia, provide a huge scope for studying relevant issues related to branding engagement in social networking sites ([29]). Social networking sites encompass a group of Web-based applications that facilitate branding related activities engagement among users, such as content consumption, contribution and creation ([56] ([70]). Consumer engagement with brands on social media is receiving increasing consideration because of its potential to **influence behavior** ([71]). Social media influence marketing has gained increased interest from marketing researchers and practioners in recent years ([74]). Social mavens are market influencers, who have information about many kinds of products, brands, places to shop, and other market's facets ([68]). They initiate conversations with consumers and respond to

requests from users to share market information ([14]; ([25]). Mavens have high media consumption and are online word of mouth referrals ([79]; [31]). Despite the sizeable literature on market mavenism concept, little is known about the maven's brand engagement mechanism. Thus, motivations of social maven in influence marketing and branded content creation, remain underexplored ([4]; ([31]).

According to the COBRA's model (Consumer online brand related activities), introduced by Shao (2008), social mavens are considered as content creators. They write brand related articles, upload brand related pictures, videos... ([71]). Hence, social mavens are the new social influencers in different digital platforms like facebook, Tweeter and Instagram. ([32]; ([84]). According to the Digital Discovery agency (2019), Instagram represents the second most used community by the Tunisian consumer after Facebook.

The research question that can be addressed is the following:

What motivate social mavens as new media influencers to create brand- related content in Instagram?

II. THEORITICAL UNDERPINNINGS

A) *Social media mavens*

Inspired by Feick and Price's classical conceptualization of market mavens and building on social influence in the digital era , the **social media maven** is defined as “*a consumer of the social network's marketplace who exhibits an elevated level of maven-like behavior, which leads him or her to be psychologically and emotionally attached to own account, and to commonly assume an opinion leadership role toward the social network*” ([4], p.3). According to the Uses and Gratification Theory ([52]), social mavens are affected by social media motives, such as community, information seeking, empowerment, and innovativeness ([25]; [42]), and can be identified via their social media brand engagement as they comment, share, recommend and importantly create original content featuring products and brands in different areas . Obviously, social mavens match the Z generation regarding personality and shopping characteristics ([28]). Gen Z are young people born between 1997 and 2012 ([89]) The newest generation of market mavens in Gen Z are an attractive segment for social media marketing campaigns, since they are always connected to social media networks. Moreover, they are highly engaged in branding management practices, and perceived as authentic and credible in promoting products and services, comparatively to traditional celebrities ([28]; [24]).

By reference to the Reasoned Action Theory (Fishbein & Ajzen 1975), the market mavens in social media, are driven by a set of attitudinal and experiential factors the digital platform offers. Consequently, they advise others, share and create relevant content, such as images and stories of products they do not intend to buy ([4]). They shape hence consumer preferences and choices ([7]) and drive marketing and social commerce outcomes ([28])

What are the underlying influence mechanisms of social mavens in social media?

To answer this question, we have chosen to focus on micro-influencers, as presented in the following section.

B) *Social media influencer marketing : a focus on micro-influencers*

The digital influencers are prominent sources of inspiration and experience for social media users. They are viewed as market experts in several domains of interest, such as fashion, lifestyle, travel, photography and so forth ([1]). The relevance and the uniqueness of their posts are key aspects for effective content marketing ([50]). Companies are reaching out social media influencers, like “instafamous” for professional collaboration in brand awareness creation ([16]). The social influence theory ([40]) highlights three eminent processes: compliance, identification, and internalization, that can be applicable to social media setting. Influence through identification and internalization is deeper than compliance ([74]). Whereas identification relies on the influencer

characteristics and qualities within a given network, internalization implied that followers accept influence, tanks to the content usefulness.

Social media influencers have been classified into four main types, regarding their followers' number. The mega-influencers, have a wide range of followers (more than 100 000), the macro-influencers have a number of followers up to 100 000, the micro-influencers, have a number of followers ranging from 1000 to 100 000. Finally, the nano-influencers are emergent nodes with a lower number of followers ([78]). Nevertheless, a large follower base does not necessarily guarantee increased follower engagement ([16]) and popularity on social media is not equivalent to opinion leadership ([61]). Followers are more likely to engage with **micro- influencers**, as they are perceived trustworthy, authentic, and relatable. In support of this argument, Instagram users tend to trust influencers with more modest numbers of followers ([16]). From practionr's perspective, social media influencers with lower followers are more likely to be highly ranked in terms of engagement rate. Accordingly, instagram micro- influencers can generate up to 50% engagement per post ([87] ([88]).

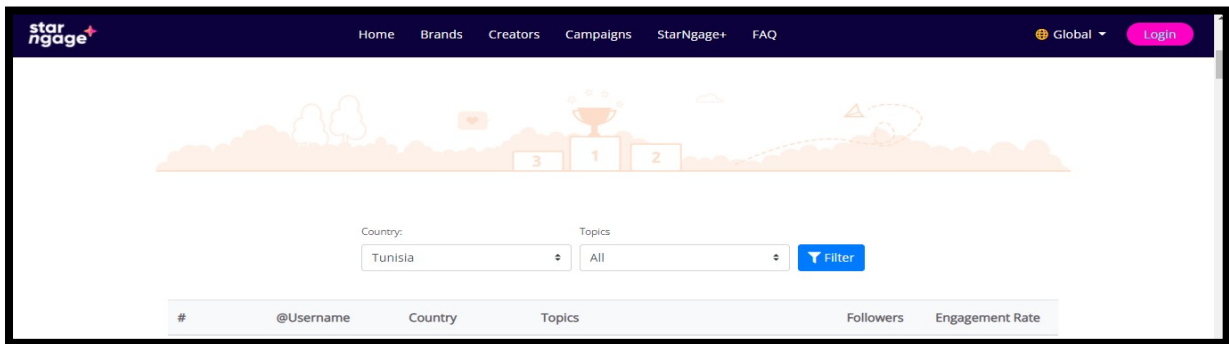
III. RESEARCH DESIGN & APPROACH

To investigate the emergent phenomenon of branded content creation among social mavens in Instagram, a qualitative approach is crucial. Inspired by twetnography ([34]), and recently Facenography ([8]), we have used an **Instanography** approach (a netnography in Instagram), during one year.

Basically, netnography relies on observation, primarily using online sources from websites, and available digital platforms ([45]). Netnography can also make use of offline qualitative research techniques, as complementary pieces to the online data, like interviews ([10]; ([45]). Social networking analysis "**SNA**" relates to the idea of mapping out networks. [30], used SNA to better understand the networks involved in word of mouth marketing communication. They assumed that the marketing area has ignored this technique, despite its insightful role in qualitative research. In this study, inspired by SNA, we have analyzed StarNgage platform to identify the influential ones in Instagram, as our research context ([44]. p.64) and to pick their interest domains ([34], p.179). We have blended hence the aforementioned methods (observation, semi-structured interviews, and digital tool analysis) as a part of our Instanography approach. In summary, we have conducted instanography among 6 Tunisian micro-influencers and 5 semi-structured interviews.

The baseline data for this study was obtained from the website StarNgage.com. StarNgage is a communication agency specializing in influence marketing, and connects influencers to different brands. StarNgage maintains a database of thousands of social media influencers based in many countries, located in North America, Asia & Africa. Importantly, the database is publicly available, allowing access to a large number of influencers active in different areas. To our knowledge, StarNgage is the best platform, providing users with insightful information regarding the **best social influencers**, in terms of follower's number and engagement rate. It permits also to filter the top instagram influencers according to the country and relevant topics of the influencer.(figure 1, p. 4). The ranking data is monthly updated.

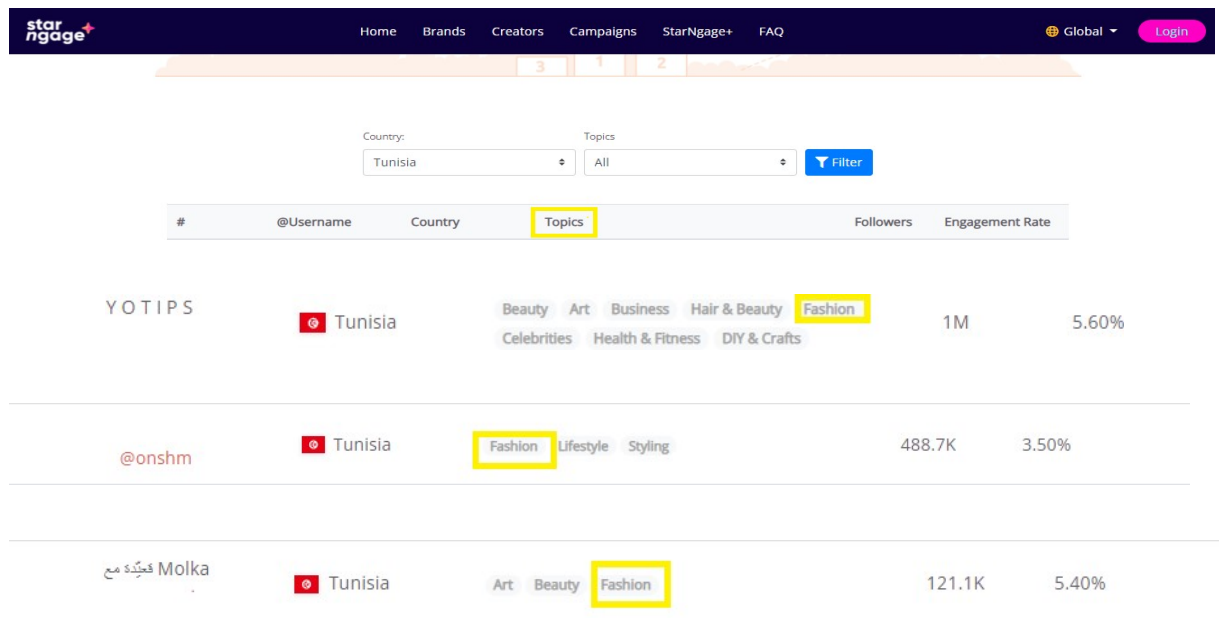
FIGURE 1 : INSTAGRAM INFLUENCER RANKING IN STARNGAGE INTERFACE



SOURCE : <https://starngage.com/app/global/influencer/ranking>

According to StarNgage, the Instagram influencer is active in more than one area, where fashion is the most common one (figure 2, p. 4). Thus, micro-influencers could be considered as social mavens.

FIGURE 2 : INTEREST DOMAINS OF TUNISIAN INFLUENCERS



SOURCE : <https://starngage.com/app/global/influencer/ranking>

Nvivo software was used to make content analysis easier and more structured ([26]). ([44], p.222) stated that netnography allows much more flexibility in coding and takes an inductive, orientation in the data analysis. All data in this study, were transcribed, and relevant instanography data were encoded with specific themes. To ensure analysis reliability, two experienced coders, both with PhDs in marketing, were selected for this study. Both coders had previous experience conducting research content analysis.

A) SAMPLING

Data were collected from 11 Tunisian Instagram micro influencers, active in different areas, such as beauty, lifestyle, fashion, travel....

IV. RESULTS

Data thematic analysis was done to find out the social mavens motivations to produce brand related content. As micro-influencers, social mavens create posts, stories featuring a myriad of products, stores, brands to fulfill different gratifications, particularly related to the content. Content-related factors are presented as follows: brand co-creation, brand evangelism, social coupon sharing and discount deals. We have hidden the micro-influencers names in the screenshots to ensure data privacy.

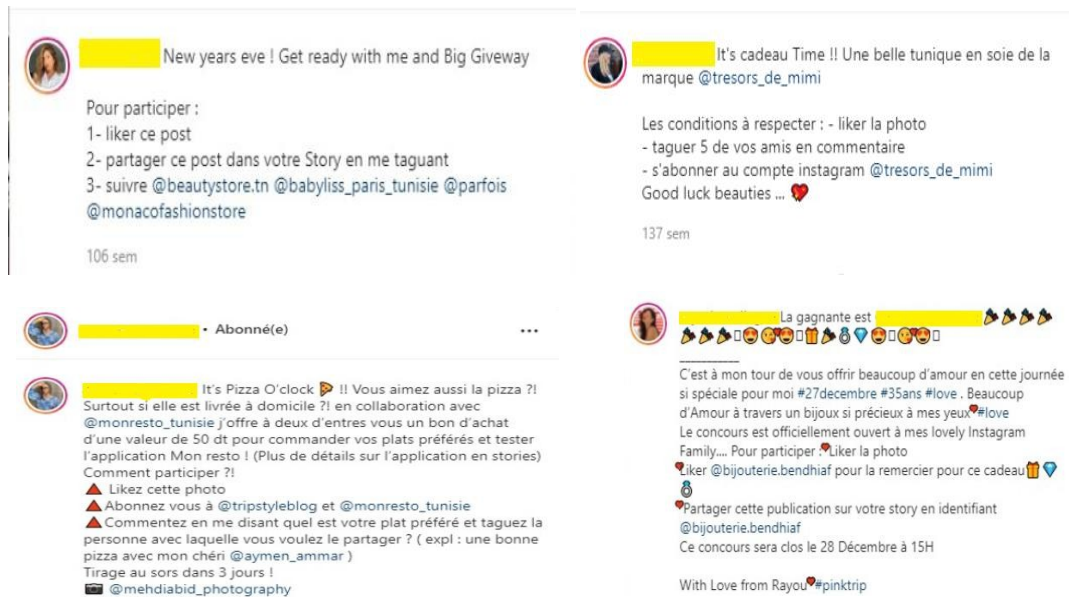
A) Brand co-creation

In a competitive environment, brands are built through a co-creation process involving different players, especially brand managers and the brands' consumers ([21]). [37] noted that co-creation is an active, creative and social process based on collaboration between companies and participants that generate mutual benefits. Hence, **brand co-creation** is a social process of active participation in the brand community and collaboration, based on the overall brand experience ([23]). According to [38], brand co-creation can be of direct or indirect nature. Its direct form, describes the interactions that occur between the customer and the brand ([80]). However, indirect co-creation refers to active consumer participation, through social media, without necessarily communicating with the brand directly ([37]), providing advice to other brand users ([80]) or sharing social media branded content ([23]). Being engaged into the process of brand co-creation, active consumers, like social mavens, perceive that they are able to influence when and how brand content is generated and exchanged ([81]). The results of our qualitative study reveal that social mavens tend to collaborate with brands across different product categories, through paid partnership and/or instagram contests techniques.

In paid Partnership, the micro influencers must mention the brand with which, they collaborate in Instagram. This type of collaboration enables social mavens to generate a relevant content, through attractive pictures and professional posts, as shown in the following screenshots:



Whereas paid partnership seems to be of an utilitarian value, Instagram contests involve hedonic sequential steps as follows: liking the post, sharing the post, tagging the target persons (instafamous, followers...) and following the target brands.



Consequently, Social mavens tend to co create value to guarantee the brand's visibility in Instagram and other social networking sites.

B) Brand Evangelism

In today's digitally connected marketplace, modern companies are paying careful attention to a relatively smaller, but highly influential, group of consumers called brand evangelists, who actively disseminate brand-related content to others, attempt to recruit consumers to try and experience the brand ([33]). Brand evangelism is defined as "a more active and committed way of spreading positive opinions and trying fervently to convince or persuade others to get engaged with the same brand." ([51], p. 27); [9]), noted that brand evangelism is as an intense form of supportive brand-related behaviors that include the brand's purchasing and providing positive referrals regarding the brand.

Other than positive e-wom disseminators, brand evangelists are opinion leaders ([6]). [17] see brand evangelists as altruist consumers, since they share brand experience with others without an expected reward. Literature on marketing suggests that brand evangelists are, inspirational consumers, advocates, brand zealots, and brand ambassadors ([17]; [64]). Most evangelical behaviors occur on social media, which allow the creation and exchange of user-generated content ([33]). In support of these arguments, we can claim that social mavens are the brand evangelists in different product categories.

Findings in our research indicate that, social mavens support brands, through positive word of mouth. As micro-influencers, social mavens tend to spread positive emotions and experiences toward their followers in Instagram. Interviewees express brand evangelism through positive words like passion, love..., as shown in the following screenshots:



We Are Mini : Spot Mini Cooper

Nos histoires définissent qui nous sommes. Ils expriment où nous avons été, ce que nous avons fait et ce que nous avons appris tout au long de notre chemin. Derrière chaque MINI se cache une belle histoire à raconter. Alors, en l'honneur de son 60ème anniversaire, j'ai eu le plaisir de collaborer avec Mini, une marque avec qui je partage mes plus beaux souvenirs et qui m'a accompagné durant mes 10 dernières années, pour raconter mon "histoire MINI" préférée. Rejoignez moi sur le site Mini (lien dans ma bio) pour partager vos expériences, vos aventures et vos passions. Une surprise vous attend ! #WeAreMINI #mini #ad 😊



You already know how much I love the @esteelauder double wear foundation. I've been trying the new double wear nude foundation for the last couple of weeks and it is now one of my favorite foundations ! It is lightweight and comfortable on my skin, the coverage is medium but definitely buildable and it blurs out my imperfections. The finish is natural and dewy, it lasts up to 9 hours without touch ups, oil free and hydrating. I highly recommend it for normal to combination skin. What's your all-time favorite foundation? 🍷

C) Social coupon sharing

Social coupons, are considered as referral coupons (referral reward programs), by which one coupon is introduced for an individual, most likely an existing customer, while the second coupon is introduced to be shared with a secondary recipient in the customer's social network ([69]). In the offline context, mavens are super-couponers because they tend to spend time and effort collecting and sometimes buying coupons ([61]).

Existing literature on **coupon sharing** is too limited. Two key articles by [75] and [83] provide initial insights into coupon sharing triggers: the high sociability and reciprocity motives. Whereas reciprocity has been established as a crucial maven's characteristic ([4], [32]) noted that high sociability is a key aspect of market mavens in social media. Accordingly, social mavens will be likely to share a social coupon regardless of their social distance from the secondary recipient because of their increased enjoyment, and high engagement in sharing information within a network (Price & al, 1988). Moreover, individuals with socializing gratification are more likely to share mobile coupons in their social network ([82]). Market mavens are brand-focused and deal-prone consumers ([31]). They focus on the cost/benefit evaluation of coupon campaigns ([54]). The second recipient is invited to use the social coupon, through a promotion code delivered by the micro-influencer, as explained in the following quotes:

"I often share promotion codes with my followers regarding Tunisian brands" (Micro-influencer 2).

"My followers in Instagram are receptive to promotion codes for new brands. They ask me for more details regarding products of the tagged brand".

(Micro-influencer 4).

D) Discount deals

Market mavens tend to be more deal prone and value-oriented, they have more favorable attitudes toward advertising, than frugal shoppers ([61]). Given their awareness of new products and brands in different product categories, market mavens are open to price promotions and daily deals information ([36]). Generally, deal prone consumers use promotional information to make purchase decisions easier ([60]) They share information about deals and they tend to "go from deal to deal" ([11]).

Micro-influencers share information featuring details about products (the product category, the discount rate, the users category) and tag the target brands and stores, as presented in the quotes below:



“I create pictures, promoting discount pricing for specific products and share the daily best deals in food and fashion domains, with my followers in Instagram” (Micro-influencer 6).

“I often write short articles about brands after trying its products, especially in private sales period. I post also in store selfie- images to share the best offers with my followers” (Micro-influencer 4)

V. CONCLUSION & RECOMMENDATIONS

The present study makes an important contribution that shows the potential of social mavens in social media influencer marketing strategy. Building on [66] recommendation, we have uncovered the role of market mavens, as micro-influencers within Instagram community.

Our results indicate that social mavens are driven by brand co-creation, brand evangelism, social coupon sharing and discount deals. These concepts are basically, content related factors. Despite limited literature on social mavenism concept, the findings of our study align with previous work regarding branding behaviours among market mavens.

To the best of our knowledge, this is the first research to suggest instanography as an original approach in data analysis.

Research on social media influencers has inherent implications for practice. Targeting social mavens remains a critical strategy to encourage word-of mouth and user generated content in the digital branding era. Accordingly, marketers should explore the ways in which social mavens promote products and brands within digital platforms. This study offers several directions for future research. First, our study focused on brand related gratifications as micro-influencers motivations to generate a valuable content in Instagram. It would be useful to explore othertypes of gratifications in different social networking sites. Second, it is of paramount importance that this study sheds light on the role of micro-influencers in the branding practices. Future research can focus on the relevant potential of nano-influencers in social media, as an emergent segment in the marketplace ([78]).

REFERENCES

- [1] Agopian, G. (2019). *Toward a Framework for Establishing Social Media Market Mavenism: An Expertise Presentation Approach*. Rensselaer Polytechnic Institute.
- [2] Ahn, J., Lee, C. K., Back, K. J., & Schmitt, A. (2019). Brand experiential value for creating integrated resort customers' co-creation behavior. *International journal of hospitality management*, 81, 104-112.
- [3] Ajzen, I., Fishbein, M., Lohmann, S., & Albarracín, D. (2018). The influence of attitudes on behavior. *The handbook of attitudes, volume 1: Basic principles*, 197-255.
- [4] Aljukhadar, M., Senecal, S., & Bériault Poirier, A. (2020). Social media mavenism: Toward an action-based metric for knowledge dissemination on social networks. *Journal of Marketing Communications*, 26(6), 636-665.
- [5] Aljukhadar, M., Senecal, S., & Bériault Poirier, A. (2020). Social media mavenism: Toward an action-based metric for knowledge dissemination on social networks. *Journal of Marketing Communications*, 26(6), 636-665.
- [6] Anggraini, L. (2018). Understanding Brand Evangelism and the Dimensions Involved in a Consumer Becoming Brand Evangelist. *Sriwijaya International Journal of Dynamic Economics and Business*, 2(1), 63-84.
- [7] Awais, M., Samin, T., Gulzar, M. A., Aljuaid, H., Ahmad, M., & Mazzara, M. (2019). User Acceptance of HUMP-Model: The Role of E-Mavenism and Polychronicity. *IEEE Access*, 7, 174972-174985.
- [8] Bebey, D. M. (2020, July). Can we talk about a Facenography?. In *Sunbelt2020*.
- [9] Becerra, E. P., & Badrinarayanan, V. (2013). The influence of brand trust and brand identification on brand evangelism. *Journal of Product & Brand Management*.
- [10] Bernard, Y. (2004). La netnographie: une nouvelle méthode d'enquête qualitative basée sur les communautés virtuelles de consommation. *Décisions marketing*, 49-62.
- [11] Boon, E. (2013). A qualitative study of consumer-generated videos about daily deal web sites. *Psychology & Marketing*, 30(10), 843-849.
- [12] Chandra, R., Pratiwi, C. P., & Larasati, H. (2021). The Role of Nano Influencers Through Instagram as an Effective Digital Marketing Strategy.
- [13] Chandra, R., Pratiwi, C. P., & Larasati, H. (2021). The Role of Nano Influencers Through Instagram as an Effective Digital Marketing Strategy.
- [14] Clark, R. A., Goldsmith, R. E., & Goldsmith, E. B. (2008). Market mavenism and consumer self-confidence. *Journal of Consumer Behaviour: An International Research Review*, 7(3), 239-248.
- [15] Darley, W., & Lim, J. S. (2018). Mavenism and e-maven propensity: antecedents, mediators and transferability. *Journal of Research in Interactive Marketing*.
- [16] Djafarova, E., & Rushworth, C. (2017). Exploring the credibility of online celebrities' Instagram profiles in influencing the purchase decisions of young female users. *Computers in human behavior*, 68, 1-7.
- [17] Doss, S. K. (2014). "Spreading the good word": toward an understanding of brand evangelism. *Journal of Management and Marketing Research*, 14, 1.
- [18] Farivar, S., Wang, F., & Yuan, Y. (2021). Opinion leadership vs. para-social relationship: Key factors in influencer marketing. *Journal of Retailing and Consumer Services*, 59, 102371.
- [19] Farzin, M., Vazifehdust, H., & Hamdi, K. (2020). Projective techniques for understanding cyber-market mavenism in social network sites. *Revista Brasileira de Gestão de Negócios*, 22, 729-749.
- [20] Fenton, A., & Procter, C. T. (2019). Studying social media communities: blending methods with netnography. *SAGE Research Methods Cases*.
- [21] Foroudi, P., Yu, Q., Gupta, S., & Foroudi, M. M. (2019). Enhancing university brand image and reputation through customer value co-creation behaviour. *Technological Forecasting and Social Change*, 138, 218-227.
- [22] France, C., Grace, D., Iacono, J. L., & Carlini, J. (2020). Exploring the interplay between customer perceived brand value and customer brand co-creation behaviour dimensions. *Journal of Brand Management*, 27(4), 466-480.
- [23] France, C., Grace, D., Merrilees, B., & Miller, D. (2018). Customer brand co-creation behavior: conceptualization and empirical validation. *Marketing intelligence & planning*.
- [24] Gaenssle, S., & Budzinski, O. (2021). Stars in social media: new light through old windows?. *Journal of Media Business Studies*, 18(2), 79-105.
- [25] Gauri, D. K., Harmon-Kizer, T. R., & Talukdar, D. (2016). Antecedents and outcomes of market mavenism: Insights based on survey and purchase data. *Journal of Business Research*, 69(3), 1053-1060.
- [26] Gerbic, P., & Stacey, E. (2005). A purposive approach to content analysis: Designing analytical frameworks. *The Internet and Higher Education*, 8(1), 45-59.
- [27] Gillison, S. T., Beatty, S. E., & Northington, W. M. (2021). Shoppers' digital deal seeking: Charting new territory. *Journal of Marketing Theory and Practice*, 1-21.

- [28] Goldring, D., & Azab, C. (2021). New rules of social media shopping: Personality differences of US Gen Z versus Gen X market mavens. *Journal of Consumer Behaviour*, 20(4), 884-897.
- [29] Gómez, M., Lopez, C., & Molina, A. (2019). An integrated model of social media brand engagement. *Computers in Human Behavior*, 96, 196-206.
- [30] Groeger, L., & Buttle, F. (2014). Word-of-mouth marketing influence on offline and online communications: Evidence from case study research. *Journal of Marketing Communications*, 20(1-2), 21-41.
- [31] Hanson, S., Kukar-Kinney, M., & Yuan, H. (2021). Understanding the impact of recipient identification and discount structure on social coupon sharing: The role of altruism and market mavenism. *Psychology & Marketing*, 38(11), 2102-2121.
- [32] Harrigan, P., Daly, T. M., Coussement, K., Lee, J. A., Soutar, G. N., & Evers, U. (2021). Identifying influencers on social media. *International Journal of Information Management*, 56, 102246.
- [33] Harrigan, P., Roy, S. K., & Chen, T. (2020). Do value cocreation and engagement drive brand evangelism?. *Marketing Intelligence & Planning*.
- [34] Hepburn, H. R., & Radloff, S. E. (Eds.). (2011). *Honeybees of asia*. Springer Science & Business Media.
- [35] Hepburn, P. (2011). *Local governance and the local online networked public sphere: enhancing local democracy or politics as usual?*. The University of Manchester (United Kingdom).
- [36] Ieva, M., De Canio, F., & Ziliani, C. (2018). Daily deal shoppers: What drives social couponing?. *Journal of Retailing and Consumer Services*, 40, 299-303.
- [37] Ind, N., Iglesias, O., & Markovic, S. (2017). The co-creation continuum: From tactical market research tool to strategic collaborative innovation method. *Journal of Brand Management*, 24(4), 310-321.
- [38] Kaufmann, H. R., Loureiro, S. M. C., & Manarioti, A. (2016). Exploring behavioural branding, brand love and brand co-creation. *Journal of Product & Brand Management*.
- [39] Kay, S., Mulcahy, R., & Parkinson, J. (2020). When less is more: the impact of macro and micro social media influencers' disclosure. *Journal of Marketing Management*, 36(3-4), 248-278.
- [40] Kelman, H. C. (2017). Further thoughts on the processes of compliance, identification, and internalization. In *Social power and political influence* (pp. 125-171). Routledge.
- [41] Khan, M. R., Iqbal, M., & Lodhi, A. J. (2021). Influencer marketing on Instagram: Effects of promotional posts on purchasing behavior of consumers. *Journal of Political Studies*, 28(1), 119-132.
- [42] Kiani, I., Laroche, M., & Paulin, M. (2016). Development of market Mavenism traits: Antecedents and moderating effects of culture, gender, and personal beliefs. *Journal of Business Research*, 69(3), 1120-1129.
- [43] Kim, H. (2021). Keeping up with influencers: exploring the impact of social presence and parasocial interactions on Instagram. *International Journal of Advertising*, 1-21.
- [44] Kozinets, R. V. (2015). *Netnography: redefined*. Sage.
- [45] Kozinets, R. V. (2019). *Netnography: The essential guide to qualitative social media research*. Sage.
- [46] Lee, J. A., & Eastin, M. S. (2021). Perceived authenticity of social media influencers: scale development and validation. *Journal of Research in Interactive Marketing*.
- [47] Lee, J. A., Sudarshan, S., Sussman, K. L., Bright, L. F., & Eastin, M. S. (2021). Why are consumers following social media influencers on Instagram? Exploration of consumers' motives for following influencers and the role of materialism. *International Journal of Advertising*, 1-23. (non access)
- [48] Liu, B., Zheng, D., Jin, Q., Chen, L., & Yang, J. (2019). VFDB 2019: a comparative pathogenomic platform with an interactive web interface. *Nucleic acids research*, 47(D1), D687-D692.
- [49] Macalik, J. (2021). Take me Down to the Vaccine City? Nano- and Micro Influencers Engagement in the Pro-Vaccination Campaign During the COVID-19 Pandemic: Evidence from Poland. *European Research Studies Journal*, 24(Special 3), 838-852.
- [50] Marques, I. R., Casais, B., & Camilleri, M. A. (2021). The Effect of Macrocelebrity and Microinfluencer Endorsements on Consumer-brand Engagement in Instagram. In *Strategic corporate communication in the digital age*. Emerald Publishing Limited.
- [51] Matzler, K., Pichler, E. A., & Hemetsberger, A. (2007). Who is spreading the word? The positive influence of extraversion on consumer passion and brand evangelism. *Marketing Theory and Applications*, 18(1), 25-32.
- [52] McQuail, D. (1984). With the benefit of hindsight: Reflections on uses and gratifications research. *Critical Studies in Media Communication*, 1(2), 177-193.
- [53] Mellado, C., & Hermida, A. (2021). A Conceptual Framework for Journalistic Identity on Social Media: How the Personal and Professional Contribute to Power and Profit. *Digital Journalism*, 1-16.
- [54] Mills, P., & Zamudio, C. (2018). Scanning for discounts: Examining the redemption of competing mobile coupons. *Journal of the Academy of Marketing Science*, 46(5), 964-982.

- [55] Mills, P., & Zamudio, C. (2018). Scanning for discounts: Examining the redemption of competing mobile coupons. *Journal of the Academy of Marketing Science*, 46, 964-982.
- [56] Muntinga, D. G., Moorman, M., & Smit, E. G. (2011). Introducing COBRAs: Exploring motivations for brand-related social media use. *International Journal of Advertising*, 30(1), 13-46.
- [57] Myers, S. (2021). Instagram Source Effects: The Impact of Familiarity and Likeability on Influencer Outcomes. *Journal of Marketing Development and Competitiveness*, 15(3), 50-55.
- [58] Neuhaus, F. (2011). New city landscapes: tracking location based social networks using twitter data. In *International Conference Virtual City and Territory (7è: 2011: Lisboa)* (pp. 541-546). Department of Civil Engineering of the University of Coimbra and e-GEO, Research Center in Geography and Regional Planning of the Faculty of Social Sciences and Humanities of the Nova University of Lisbon.
- [59] Park, J. (2018). Analysis of factors influencing the deal proneness of consumers for processed foods. *Korean Journal of Agricultural Science*, 45(3), 533-545.
- [60] Park, J., Lee, J. M., Xiong, V. Y., Septianto, F., & Seo, Y. (2021). David and Goliath: When and Why Micro-Influencers Are More Persuasive Than Mega-Influencers. *Journal of Advertising*, 1-19.
- [61] Price, L. L., Feick, L. F., & Guskey-Federouch, A. (1988). Couponing behaviors of the market maven: profile of a super couponer. *ACR North American Advances*.
- [62] Price, L. L., Feick, L. F., & Guskey-Federouch, A. (1988). Couponing behaviors of the market maven: profile of a super couponer. *ACR North American Advances*.
- [63] Reinecke Flynn, L., & Goldsmith, R. E. (2017). Filling some gaps in market mavenism research. *Journal of Consumer Behaviour*, 16(2), 121-129.
- [64] Riivits-Arkonsuo, I., Kaljund, K., & Leppiman, A. (2015). Consumer journey from first experience to brand evangelism. *Research in economics and business: Central and eastern Europe*, 6(1).
- [65] Rossanty, Y., Sari, P. B., Amlus, M. H., & Nasution, T. A. M. (2021). Islam, Opinion Leaders, and Social Media Influencer. In *The Role of Islamic Spirituality in the Management and Leadership Process* (pp. 66-84). IGI Global.
- [66] Rossolatos, G. (2019). Negative brand meaning co-creation in social media brand communities: A laddering approach using NVivo. *Psychology & Marketing*, 36(12), 1249-1266.
- [67] Rutter, R. N., Barnes, S. J., Roper, S., Nadeau, J., & Lettice, F. (2021). Social media influencers, product placement and network engagement: using AI image analysis to empirically test relationships. *Industrial Management & Data Systems*.
- [68] Ruvio, A., & Shoham, A. (2007). Innovativeness, exploratory behavior, market mavenship, and opinion leadership: An empirical examination in the Asian context. *Psychology & Marketing*, 24(8), 703-722.
- [69] Ryu, G., & Feick, L. (2007). A penny for your thoughts: Referral reward programs and referral likelihood. *Journal of Marketing*, 71(1), 84-94.
- [70] Schivinski, B., Christodoulides, G., & Dabrowski, D. (2016). Measuring consumers' engagement with brand-related social-media content: Development and validation of a scale that identifies levels of social-media engagement with brands. *Journal of advertising research*, 56(1), 64-80.
- [71] Schivinski, B., Muntinga, D. G., Pontes, H. M., & Lukasik, P. (2021). Influencing COBRAs: the effects of brand equity on the consumer's propensity to engage with brand-related content on social media. *Journal of Strategic Marketing*, 29(1), 1-23.
- [72] Silalahi, A. T. (2021). Micro-Influencer Celebrity's Communication Strategy in Brand Promotion. *Humaniora*, 12(1), 21-28.
- [73] Stokburger-Sauer, N. E., & Hoyer, W. D. (2009). Consumer advisors revisited: What drives those with market mavenism and opinion leadership tendencies and why?. *Journal of Consumer Behaviour: An International Research Review*, 8(2-3), 100-115.
- [74] Tafesse, W., & Wood, B. P. (2021). Followers' engagement with instagram influencers: The role of influencers' content and engagement strategy. *Journal of Retailing and Consumer Services*, 58, 102303.
- [75] Tang, Q., Zhao, X., & Liu, S. (2016). The effect of intrinsic and extrinsic motivations on mobile coupon sharing in social network sites: the role of coupon proneness. *Internet Research*. Atlantis Press.
- [76] Van Driel, L., & Dumitrica, D. (2021). Selling brands while staying "Authentic": The professionalization of Instagram influencers. *Convergence*, 27(1), 66-84.
- [77] Wei, Q., Dai, Q., & Liang, Y. (2021, December). Influencer Marketing for Start-ups: The Rise of Micro-influencers. In *2021 3rd International Conference on Economic Management and Cultural Industry (ICEMCI 2021)* (pp. 2179-2182). Atlantis Press.
- [78] Wibawa, R. C., Pratiwi, C. P., & Larasati, H. (2021, December). The Role of Nano Influencers Through Instagram as an Effective Digital Marketing Strategy. In *Conference Towards ASEAN Chairmanship 2023 (TAC 23 2021)* (pp. 233-238). Atlantis Press.
- [79] Wiedmann, K. P., Walsh, G., & Mitchell, V. W. (2001). The Mannmaven: an agent for diffusing market information. *Journal of Marketing Communications*, 7(4), 195-212.

- [80] Yi, Y., & Gong, T. (2013). Customer value co-creation behavior: Scale development and validation. *Journal of Business research*, 66(9), 1279-1284.
- [81] Zadeh, A. H., Zolfagharian, M., & Hofacker, C. F. (2019). Customer–customer value co-creation in social media: conceptualization and antecedents. *Journal of Strategic Marketing*, 27(4), 283-302.
- [82] Zhang, S., Zhao, L., Lu, Y., & Yang, J. (2016). Do you get tired of socializing? An empirical explanation of discontinuous usage behaviour in social network services. *Information & Management*, 53(7), 904-914.
- [83] Zhao, X., Tang, Q., Liu, S., & Liu, F. (2016). Social capital, motivations, and mobile coupon sharing. *Industrial Management & Data Systems*.
- [84] Zhou, S., Barnes, L., McCormick, H., & Cano, M. B. (2021). Social media influencers' narrative strategies to create eWOM: a theoretical contribution. *International Journal of Information Management*, 59, 102293.
- [85] <https://starngage.com/app/global/influencer/ranking/tunisia/fashion>
- [86] <https://www.melting.tn/tawa-nouvelle-plateforme-de-marketing-dinfluence-en-tunisie/>
- [87] <https://starngage.com/app/global/page/social-media-influencers>
- [88] <https://starngage.com/app/global/page/micro-influencers>
- [89] <https://www.pewresearch.org/short-reads/2019/04/10/share-of-u-s-adults-using-social-media-including-facebook-is-mostly-unchanged-since-2018/>

PROPOSING A CONCEPTUAL RESEARCH MODEL FOR LEAN AND GREEN SUPPLY CHAIN TO ACHIEVE SUSTAINABILITY PERFORMANCE.

Mohamed Mabrouk ^{#1}, Raoudha Kammoun ^{*2},

*#Modils, FSEG-Sfax,
FSEG-Sfax, Tunisia*

mabroukm921@gmail.com
raoudha.kammoun@fsegs.usf.tn

Abstract— A contemporary demand of the corporate environment consists in searching for a balance between profit growth, cost reductions and environmental considerations. Being Lean and Green is a trend that organizations are beginning to recognize as crucial in overcoming challenges and achieving economic, social, and environmental success. The Lean/Green supply chain management strategy enables the continuous improvement of all operations connected with the management of physical and informational flows, waste prevention, and human resource management. Thus, to address the research gap in previous studies, we examined the impact of a Lean Green Supply chain management system on sustainability performance.

This paper proposes a conceptual model, which incorporates aspects that have previously been examined separately. To this end, we will use a hybrid research approach consisting of not only two qualitative studies based on an interview guide, but also a quantitative study by using a questionnaire presented to SEMs. This work presents the major theoretical insights to help leaders alter variables that promote excellent workflow while respecting the environment and achieving goals effectively.

Keywords—lean practice, sustainability practice, process innovation, sustainability performance.

I. INTRODUCTION

This document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website.

With a growing concern for the environment as a major determinant of any company's sustainability, it is important to study green behavior in the context of emerging economies. Based on both economic and non-economic aspects, a company's long-term performance is designated by its values and communication strategies (Schaltegger and agner, 2017). The implementation of corporate social responsibility is also reflected in the long-term performance of companies. In addition, the long-term sustainability of companies is assessed using three main components, namely economic performance indicators, social performance indicators, and environmental performance indicators (Muhammad et al, 2020). Supply chain management practices are closely related to customer satisfaction. They require the close coordination and integration of the business framework. The business process, which must be coherent, includes manufacturing, purchasing, marketing, logistics and information systems. Therefore, supply chain management practices focus on customer response, quality, and environmental sustainability (De et al, 2020). Often, audiences' responses to Lean principles and requirements can be different only when the Lean mindset is communicated effectively.

Companies must typically go on a non-linear voyage of discovery to effectively execute green supply chain activities, such as updating or adapting their products, developing new methodologies, and adopting new business models. Thus, to better understand the mediating function of innovation and lean methods while taking into account the influence of production practices on sustainability performance, this paper raises an important question:

Can process innovation and the implementation of Lean and Green practices improve sustainability performance?

The remainder of this paper is structured as follows. The literature review defines the key concepts. Then, the relationships between them are explained in order to clarify the hypotheses of our research and propose our conceptual model, as a combination of variables that have never been tested together before. Next, the adopted research methodology identifies our theoretical and managerial contributions. Finally, we summarize our paper and draw some conclusions.

II. LITERATURE REVIEW

Green supply chain management (GSCM) refers to the distribution of products and services from suppliers and producers to end users while considering information, monetary, and material flows in the environment (Zhu et al., 2012). Supply chain management (SCM) is associated with an environmental perspective of GSCM, which includes material sourcing and selection, product design, manufacturing processes, distribution of final products to customers, and disposal of expired products (Srivastava, 2007). Due to consumer demands and legal requirements, monitoring and evaluating environmental management represents the initial stage of GSCM, which results in the adoption of proactive measures involving several reverse activities such as refurbishment, recycling, reworking, reuse and remanufacturing (Ali and Haseeb ,2019).

A. Process Innovation

Process innovation refers to the implementation of a new or significantly improved production or delivery method in order to increase (=enhance) productivity.

It gives the firm an overall cost advantage over its competitors, allowing it to achieve a higher margin rate. This process includes significant changes in techniques, equipment and/or software (Adams et al., 2016). Cleaner production is an example of process innovation for environmental sustainability. In this context, Hullova et al. (2016) investigated the dynamics beyond the introduction of two forms of innovation by studying cases where cost-reducing innovation requires the development of new products, while the introduction of a new product necessitates changes in the manufacturing process.

B. Lean practices

Lean practices (LP) have been adopted by many manufacturing and service companies to reduce waste without sacrificing quality or performance. There is a growing interest in linking Lean practices with the environment (Martínez-Jurado and Moyano-Fuentes, 2014). LP is economically and environmentally focused because, philosophically speaking, Lean focuses on reducing waste by optimizing resources across the organizational value chain. However, the environmental and social sustainability may not be fully achieved even if Lean focused on economy, as some environmental and social practices can be costly (Inman and Green, 2018).

Previous work has successfully linked LP with sustainability (Martinez-Jurado and Moyono-Fuentes, 2014). LP facilitate the adoption of green manufacturing principles and improve the environmental performance of numerous manufacturing firms (Piercy and Rich, 2015). Even though LP contribute to environmental sustainability (Vinodh et al., 2011), the results are still inconclusive, as both positive (King and lenox, 2001) and negative (Rothenberg et al., 2001) relationships exist. In addition, the relationship between LP and social management is also inconclusive.

C. Lean/sustainable production practices

The production process in itself is critical to maintain a balance in the development of commodities. This process can be made more resilient through the use of improved technologies (Meera and Chitramani, 2016). Choosing a cleaner production method allows organizations to reduce the amount of toxic materials released during the process. However, due to a variety of challenges, it is hard to implement this method. Organizations are often unaware of these technological breakthroughs, the application of which can lead to greater efficiency in their production operations in terms of environmental protection (Yu et al., 2019). In addition, cleaner production methods contribute to financial, social, and environmental sustainability (Bhandari et al., 2019). Therefore, technology adoption for cleaner production plays a key role in facilitating the deployment of Green Supply Chain Management. In both research and practice, sustainable production is a much-debated topic (Taisch et al., 2014). Current trends show the way to ensure sustainable production: laws emphasizing social responsibility, local economic dynamics, and consumers increasingly interested in purchasing products and services linked to economically feasible as well as socially and environmentally responsible methods (Faccio et al., 2020). Businesses should use sustainable production to improve performance while reducing environmental damage and promoting social solidarity in the future (Kleindorfer et al., 2005).

D. Sustainability performance

Firms have difficulties in maintaining their economic, environmental, and social performance due to this pressure (Zailani et al., 2015). A company's sustainability performance must establish a strong relationship between economic, environmental and social performance in order to build a sustainable competitive advantage (Thoo et al., 2013). Organizational sustainability consists of three major parts, namely economic performance, environmental performance and social performance (Shrivastava, and Shrivastava, 2016).

Sustainability performance investigates different issues, such as examining the potential negative effects of economic transactions on the environment in both developing and developed countries (Koo et al., 2014); meeting the social well-being as defined by Maslow's hierarchy of needs (Seth et al., 2016); and ensuring the conservation of natural resources, both renewable and nonrenewable, to meet and preserve the needs of future generations (Koo et al., 2014). Previous research has suggested that organizational sustainability lies at the intersection of economic, environmental, and social performance (Shrivastava, and Shrivastava, 2016). This view is consistent with Elkington's (1998) concept of triple bottom line.

Therefore, in this study, sustainability performance is examined from three perspectives. The definitions of sustainability performance concepts are as follows. Sustainability performance refers to the intersection of economic, environmental, and social elements (Carter and Rogers (2008), Paulraj (2011); Foerstl et al. (2015); Montabon et al. (2016); Schmidt et al. (2017).)

Mobilization theory

Dynamic capability theory: A dynamic capability is defined as "the ability of an organization to integrate, build, and reconfigure internal and external competencies to cope with rapidly changing environments" (Teece et al., 1997). It is also integrated as a process or a set of processes related to resource management (Eisenhardt & Martin, 2000).

From a dynamic capabilities perspective, Teece (2007) noted that continuous learning supports the development of concurrent and subsequent innovations, and the development of concurrent and prior capabilities facilitates the development of additional competencies. Dynamic capabilities theory is an extension of the resource-based worldview (RBV). The latter focuses on resource selection, whereas dynamic capabilities concentrate on resource development and renewal. In this respect, Hitt et al (2016) explain how physical and intangible resources are pooled to create capabilities. Dynamic capability theory is also integrated into RBV to show how to gain a competitive advantage in the supply chain (Squire et al 2009).

Supply chain dynamic capability, based on dynamic capability theory, is able to adjust the supply chain. It is a new and popular concept in recent years, but its substance is difficult to grasp (Defee and Fugate., 2010).

According to Kirci and Seifert (2016), dynamic capabilities serve as the foundation of a long-term competitive advantage in Supply Chain Management (SCM) for companies. Since SCM is coupled with the dynamic capability theory, it is important to study the long-term supply chain development based on the aforementioned theory.

Dynamic capabilities contribute to maintaining high performance by adjusting the mix of resources to gain and maintain a competitive advantage (Teece et al., 1997). As a result, they can maintain a high level of performance over an extended period of time (Bititci et al., 2011). This high level of performance can then be translated into financial benefits (Hohenstein et al., 2015).

III. THE RELATIONSHIP BETWEEN VARIABLES

We will examine the relationship between many factors in our research after reviewing the related literature in the first section. In this vein, we will investigate the effect of Lean practices on the dependent variable, the effect of production practices on sustainability performance, the effect of process innovation on sustainability performance, the mediating effect of process innovations and sustainability practices on sustainability performance, and the effect of production practices on Lean practices and sustainability performance, by taking into account the theoretical background and references.

Lean practice and sustainability performance

Organizations working on integrated practices have used Lean practices in various industries to improve efficiency and competitiveness. Several benefits of Green supply chain management (GSCM) have been reported in the literature. These benefits can be derived from the diffusion of Lean practices (Viles et al., 2021).

Ikumapayi et al. (2020) point out that the next step in waste management productivity consists in promoting and motivating waste generators to minimize GSCM and improve overall socioeconomic circumstances.

Variable outcomes can be attributed to a variety of factors, including data used in the analysis part and the definitions of operational performance. In our study, we define the benefits of GSCM as positive economic improvements, such as reduced material costs and reduced energy consumption costs. We also define the associated negative economic outcomes, like increased investment, increased operational costs, increased training costs, and high costs of environmentally friendly materials. Unlike previous studies, this data focuses on economic and financial performance indicators that are more operational in nature, than overall company performance indicators, such as stock price, market share, return on assets, and return on investment.

E. The adoption of Lean Practices by SME Leaders

Adopting Lean Practices Leads to Better Resource Utilization or Additional Cost

- LP focus on resource efficiency and waste reduction.
- Lean methods as environmental and social practices can be costly.

However, we hypothesize the following:

- H 1a: Lean practices improve the sustainability performance of SMEs.

The impact of lean production practices on supply chain performance

An audit method is used to evaluate the implementation of production practices in the production cell. It is a systematic, independent, and documented procedure for collecting evidences and evaluating them objectively to determine the extent to which audit criteria are met (Chiesa et al., 1996).

Lean manufacturing, based on the principles and processes of the Toyota Production System (Powell et al., 2013), is one of the most powerful improvement approaches that aim at providing manufacturers with a new competitive advantage. Shah and Ward (2007) view lean manufacturing as an integrated socio-technical system that strives to eliminate waste by simultaneously reducing or minimizing supplier, customer, and internal variability.

The main thrust of Lean manufacturing is that these practices can work together to reduce waste in the organization, optimize core resources, and build a corporate culture to identify and implement not only lean manufacturing strategies that promote customer satisfaction (Chiaranza, 2003), but also customer satisfaction strategies (Karim and Arif-Uz-Zaman 2013). Lean production has been designed and validated by large companies, resulting in a significant increase in production capacity and performance. (Belhadi, Touriki, and El Fezazi , 2017)

- H1b: GSCM production practices have a positive relationship with sustainability performance.

F. The effect of process innovation on GSCM performance

Based on the literature, there is broad agreement on the favorable impact of process innovation on several forms of performance, including customer satisfaction, operational performance, financial performance and competitive advantage (Brem et al., 2016).

Process innovation refers to the improvement of existing processes and/or the development of new processes that use environmentally friendly technologies or production equipment to avoid or reduce harm to the Environmental Public Health and Consumer Protection Commission (Orsato, R.J 2006).

The ability to implement process innovations is considered as a dynamic capability since process innovations are changing the way of doing things in the firm (Macher and Mowery, 2009).

The adoption of process innovations, on the other hand, encompasses all firm activities related to the recognition of a potentially beneficial innovation, the decision to be adopted and its incorporation into the firm's operating procedures.

G. The perception of process innovation by SME managers

Process innovation should contribute to the synergy between competitive strategies and supply chain strategies:

Process innovation must satisfy customers at optimum costs of quality.

Process innovation must promote the achievement of environmental and social objectives.

It would therefore be useful to know how SME managers perceive the relationship between PI and SP:

H2a. Process innovation helps SMEs improve PS.

H2b. Process innovation mediates the relationship between SGMC production practices and sustainability performance, and examines the combined effect of lean/green practices and process innovation on GSC performance.

The major findings of this study reveal that process innovation does not have a direct positive effect on green supply chain performance. However, other results show that process innovation has an "amplifying" effect, which contributes to SCI and green practices. In fact, it provides a higher rate of return on green supply chain performance when combined with process innovation activities.

H. As a result, this work demonstrated a positive synergistic effect between process innovation and LM/green practices,

in which the former reinforces the latter. Based on the literature, there have been no previous studies on the relationship between process innovation and LM/green practices and their potential impact on performance. Thus, it is impossible to demonstrate an alignment or misalignment of these results using an academic theory. However, as LM has already been shown to stimulate innovation, including process innovation (He et al, 2015), the synergistic beneficial effect of process innovation and Lean/green practices on CSG performance can be perceived in this study based on that theory. LM and green practices may be interchangeable and transferable across companies and supply chains due to their nature and current maturity. Yet, the advantages (=assets) of LM and green practices can be enhanced when implemented in a company's operations in a novel way.

The adoption of sustainability practices by leaders includes several dimensions:

- Economic dimension
- Environmental dimension
- Social dimension

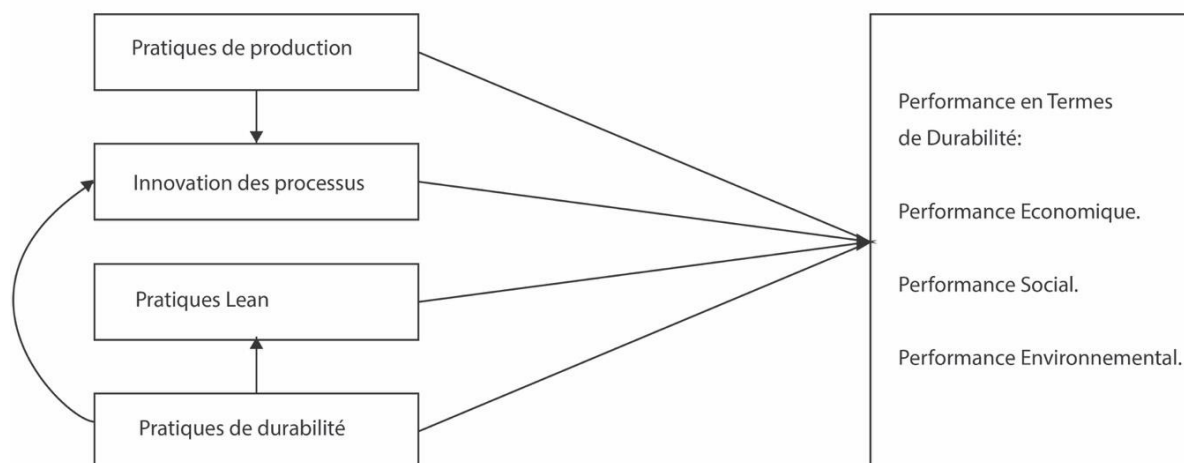
Therefore, in addition to testing the relationship between LP, PI and SP, the impact of SP on SP is also studied.

Hypothesis 3a: Sustainability practices improve the sustainability performance of SMEs.

Hypothesis 3b: Sustainability practices improve the sustainability performance of SMEs through the mediating effects of LP.

Hypothesis 3c: Sustainability practices enhance sustainability performance of SME through IP mediation effects.

We propose our research model based on the theoretical foundation established earlier based on our literature review:



THE CONCEPTUAL MODEL. (IN THE FIGURE: PRODUCTION PRACTICES, PROCESS INNOVATION, LEAN PRACTICES, SUSTAINABILITY PRACTICES, SUSTAINABILITY PERFORMANCE, ECONOMIC PERFORMANCE, SOCIAL PERFORMANCE, ENVIRONMENTAL PERFORMANCE)

IV. RESEARCH METHODOLOGY

The present paper adopts a hypothetico-deductive method based on epistemological positioning as well as an adequate post-positivist posture. We also apply a hybrid research method (based on both mixed-qualitative and quantitative approaches). In this respect, we use two qualitative studies based on an interview. Out of 46 SMEs, a quantitative study is also utilized based on a survey (a questionnaire). We implement the AMOS software for data analysis.

Theoretical contributions

First, one of the major principles of Lean and green supply chain management is continuous improvement. To satisfy consumers' needs and reduce their impact on the environment, companies must continually seek ways to improve their operations. Second, the green supply chain requires sustainable practices, such as adopting clean technologies and ethical behaviors to minimize environmental impacts. Third, social responsibility is closely linked to lean management and green supply chain. Companies are responsible for reducing their impact on the environment while meeting their consumers' demands. Finally, cost reduction is one of the major advantages of lean management and green supply chain. Companies can increase their profits by preserving the environment and maximizing available resources.

Managerial implications

First, it is important to adopt a customer-centric approach. In fact, Lean focuses on improving customer satisfaction through the continuous management of quality and manufacturing costs, while green supply chain aims to reduce carbon emissions and environmental impacts. Both methods prioritize the consumer. Second, the primary purpose of lean and green supply chain management is to eliminate all waste and inefficiencies in manufacturing and distribution operations. Thus, production costs are minimized, while available resources are optimized. Third, due to the complexity of the green supply chain, collaboration and partnerships are essential. To reduce carbon emissions and limit environmental impacts, companies must be able to collaborate. Finally, lean management and green supply chain require rapid adaptation to change. Companies must be able to quickly adapt to meet changing customer needs and deal with unexpected changes.

V. CONCLUSION

The successful integration of green and lean practices into the corporate supply chain requires a comprehensive understanding to determine the set of practices that contribute most to the improvement of each component of sustainable performance. This is the main purpose of this research paper, which reviewed the existing literature in lean and green supply chain management. This study is important and relevant to other scientists in the same field because it has identified and classified the most salient green and lean practices associated with the upstream, internal and downstream supply chain. The proposed model will fill the gap in previous studies and highlight the combined effect of different variables to achieve sustainability performance.

VI. REFERENCES

- Ali, A., & Haseeb, M. (2019). Radio frequency identification (RFID) technology as a strategic tool towards higher performance of supply chain operations in textile and apparel industry of Malaysia. *Uncertain Supply Chain Management*, 7(2), 215-226.
- Ab Talib, M. S., Abdul Hamid, A. B., & Thoo, A. C. (2015). Critical success factors of supply chain management: a literature survey and Pareto analysis. *EuroMed Journal of Business*, 10(2), 234-263.
- Ali, M. H., Suleiman, N., Khalid, N., Tan, K. H., Tseng, M. L., & Kumar, M. (2021). Supply chain resilience reactive strategies for food SMEs in coping to COVID-19 crisis. *Trends in food science & technology*, 109, 94-102.
- Awan, F. H., Dunnan, L., Jamil, K., Mustafa, S., Atif, M., Gul, R. F., & Guangyu, Q. (2022). Mediating role of green supply chain management between lean manufacturing practices and sustainable performance. *Frontiers in Psychology*, 12, 810504.
- Brusset, X., & Teller, C. (2017). Supply chain capabilities, risks, and resilience. *International Journal of Production Economics*, 184, 59-68.
- Bag, S., Dhamija, P., Gupta, S., & Sivarajah, U. (2021). Examining the role of procurement towards remanufacturing operations and circular economy. *Production Planning & Control*, 32(16), 1368-1383.
- Bianchi, M., Cavaliere, A., Chiaroni, D., Frattini, F., & Chiesa, V. (2011). Organisational modes for Open Innovation in the bio-pharmaceutical industry: An exploratory analysis. *Technovation*, 31(1), 22-33.
- Belhadi, A., Touriki, F. E., & El Fezazi, S. (2017). Prioritizing the solutions of lean implementation in SMEs to overcome its barriers: An integrated fuzzy AHP-TOPSIS approach. *Journal of Manufacturing Technology Management*, 28(8), 1115-1139.
- Carter, C. R., & Liane Easton, P. (2011). Sustainable supply chain management: evolution and future directions. *International journal of physical distribution & logistics management*, 41(1), 46-62.
- Caldwell, N., Harland, C., Powell, P., & Zheng, J. (2013). Impact of e-business on perceived supply chain risks. *Journal of Small Business and Enterprise Development*, 20(4), 688-715.
- Duchi, A., Pourabdollahian, G., Sili, D., Cioffi, M., Taisch, M., & Schönsleben, P. (2014). Motivations and challenges for engineer-to-order companies moving toward mass customization. In *Advances in Production Management Systems. Innovative and Knowledge- Based Production Management in a Global-Local World: IFIP WG 5.7 International Conference, APMS 2014, Ajaccio, France, September 20-24, 2014, Proceedings, Part III* (pp. 320-327). Springer Berlin Heidelberg.

De Steur, H., Wesana, J., Dora, M. K., Pearce, D., & Gellynck, X. (2016). Applying Value Stream Mapping to reduce food losses and wastes in supply chains: A systematic review. *Waste management*, 58, 359-368.

Dwivedi, A., & Paul, S. K. (2022). A framework for digital supply chains in the era of circular economy: Implications on environmental sustainability. *Business strategy and the environment*, 31(4), 1249-1274.

Fayezi, S., Zutshi, A., & O'Loughlin, A. (2017). Understanding and development of supply chain agility and flexibility: a structured literature review. *International journal of management reviews*, 19(4), 379-407.

Green, K. W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2019). Impact of JIT, TQM and green supply chain practices on environmental sustainability. *Journal of Manufacturing Technology Management*, 30(1), 26-47.

Handfield, R. B., Cousins, P. D., Lawson, B., & Petersen, K. J. (2015). How can supply management really improve performance? A knowledge- based model of alignment capabilities. *Journal of Supply Chain Management*, 51(3), 3-17.

Hong, J., Zhang, Y., & Ding, M. (2018). Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of cleaner production*, 172, 3508-3519.

Hullova, D., Trott, P., & Simms, C. D. (2016). Uncovering the reciprocal complementarity between product and process innovation. *Research policy*, 45(5), 929-940.

Ikumapayi, O. M., Laseinde, O. T., Ogedengbe, T. S., Afolalu, S. A., Ogundipe, A. T., & Akinlabi, E. T. (2023, March). An Insight into AI and ICT Towards Sustainable Manufacturing. In *Proceedings of Fourth International Conference on Communication, Computing and Electronics Systems: ICCCES 2022* (pp. 271-280). Singapore: Springer Nature Singapore.

King, A. A., & Lenox, M. J. (2001). Does it really pay to be green? An empirical study of firm environmental and financial performance: An empirical study of firm environmental and financial performance. *Journal of industrial ecology*, 5(1), 105-116.

Köhler, J., Sönnichsen, S. D., & Beske- Jansen, P. (2022). Towards a collaboration framework for circular economy: The role of dynamic capabilities and open innovation. *Business Strategy and the Environment*, 31(6), 2700-2713.

Laihonen, H., & Pekkola, S. (2016). Impacts of using a performance measurement system in supply chain management: a case study. *International Journal of Production Research*, 54(18), 5607-5617.

Martínez-Jurado, P. J., & Moyano-Fuentes, J. (2014). Lean management, supply chain management and sustainability: a literature review. *Journal of Cleaner Production*, 85, 134- 150.

- Manupati, V. K., Jedidah, S. J., Gupta, S., Bhandari, A., & Ramkumar, M. (2019). Optimization of a multi-echelon sustainable production-distribution supply chain system with lead time consideration under carbon emission policies. *Computers & Industrial Engineering*, 135, 1312-1323.
- Rad, F. F., Oghazi, P., Palmié, M., Chirumalla, K., Pashkevich, N., Patel, P. C., & Sattari, S. (2022). Industry 4.0 and supply chain performance: A systematic literature review of the benefits, challenges, and critical success factors of 11 core technologies. *Industrial Marketing Management*, 105, 268-293.
- Richey Jr, R. G., Morgan, T. R., Lindsey-Hall, K., & Adams, F. G. (2016). A global exploration of big data in the supply chain. *International Journal of Physical Distribution & Logistics Management*, 46(8), 710-739.
- Rehman, M. A. A., Aneyrao, T. A., Pachchhao, A. D., & Shrivastava, R. L. (2016). Identification of performance measures in Indian automobile industry: a green supply chain management approach. *International Journal of Business Performance Management*, 17(1), 30-43.
- Srivastava, S. K. (2007). Green supply- chain management: a state- of- the- art literature review. *International journal of management reviews*, 9(1), 53-80.
- Schmidt, C. G., Foerstl, K., & Schaltenbrand, B. (2017). The supply chain position paradox: green practices and firm performance. *Journal of supply chain management*, 53(1), 3-25.
- Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of operations management*, 25(4), 785-805.
- Vinodh, S., & Prasanna, M. (2011). Evaluation of agility in supply chains using multi-grade fuzzy approach. *International Journal of Production Research*, 49(17), 5263-5276.
- Wei, H. L., & Wang, E. T. (2010). The strategic value of supply chain visibility: increasing the ability to reconfigure. *European Journal of Information Systems*, 19, 238-249.
- Yu, H., Zhao, Y., Liu, Z., Liu, W., Zhang, S., Wang, F., & Shi, L. (2021). Research on the financing income of supply chains based on an E-commerce platform. *Technological Forecasting and Social Change*, 169, 120820.
- Zhu, Q., Sarkis, J., & Lai, K. H. (2012). Examining the effects of green supply chain management practices and their mediations on performance improvements. *International journal of production research*, 50(5), 1377-1394.

Dr. GRIBI DJAMILA

Assistant professor at Hassiba Ben Bouali University Chlef Algeria

Laboratory of : “entrepreneurship and corporate governance”

Email: d.gribi@univ-chlef.dz

[Tél : 00 213 6 96 61 67 97](tel:00213696616797)

Contribution in the topic of the “Economic development” entitled:

**“Relationship between economic growth and the human development index in
Algeria: econometric study between 1990 and 2022 ”**

Abstract :

The objective of our study is to establish a relationship between growth and economic development in Algeria. For this purpose, we will study the evolution of GDP and the human development index over the period (1990-2022).

Different econometric methods were used: regression, correlation and Granger causal test to establish a relationship between the two indicators: gross domestic product (GDP) and the human development index (HDI). Our results showed the non-existence of a relationship between the two variables contrary to what the economic theories stipulate.

1- Introduction:

Economic growth and development are two inseparable terms. Since Adam Smith, these two concepts have formed the heart of scientific research (Bettelheim, (1960).Gadrey, (2002). Huart, (2003)). Several models have been developed to provide a theoretical framework for growth and economic development, which are mainly intended for developing countries.

Economic growth is seen as a concern of every country in the world. It can be defined as a quantitative phenomenon that measures the change in GDP between two successive years. Economic theories to explain the causes of economic growth are numerous ranging from models of exogenous growth such as the SOLOW model (Feldstein, M., Horioka, C., & Savings, D. (1992)) endogenous growth models such as Schupmeter’s (Guellec, (1992)). Often the indicator used to measure economic growth is GDP growth or GDP/capita growth.

As for development, it is a qualitative phenomenon that takes into account the economic, social, political and living structures of the population. There are also many models of economic development, all of which have stressed the importance of making investments to improve economic conditions, health, education, housing... ((Pottier, 1963), (Van Den Berg,2016)). The main indicator used to measure development is the HDI developed by UNDP in 1990.

In Algeria, since its independence, the concept of development has been highlighted in all policies adopted and models retained. Economic growth does not seem to be a priority

until the implementation of the structural adjustment plan in 1994. The transition from a administered to a market economy forced the government to marry the two terms in order to improve the economic and social situation of its population.

Our study tries to highlight the relationship between economic growth (measured by GDP growth) and economic development (measured by the HDI) in Algeria.

Thus, in order to analyse the impact of economic growth on the human development index, scientific curiosity leads to the following questions:

How have economic growth and the human development index evolved in Algeria?

To what extent is growth affecting the human development index?

What are the explanatory factors?

Assumptions:

The following assumptions have been made based on empirical knowledge and observations:

Economic growth in Algeria has followed a positive trend.

. The human development index has followed a positive trend.

. Economic growth has a significant effect on the human development index in Algeria.

These assumptions are checked in the body of work.

Methods used:

Our scientific work follows a specific and adapted methodological approach. Therefore, the econometric method is requested.

It will allow us to analyze the impact of economic growth on the human development index and the evolution over time of these variables (between 1990 and 2022), on the one hand, the processing of the data collected and the interpretation of the results, on the other hand. To operationalize this method and collect the necessary data for the work, several techniques were used, namely: documentary technique and observation.

The objective of the research is to:

The general objective of this study is to analyze the degree of relationship between economic growth and the human development index in Algeria.

With regard to the specific objectives, the following are discussed:

-To analyses the evolution of economic growth on the one hand and of the human development index in Algeria on the other hand during 1990-2022;

-Assess the impact of economic growth on the human development index;

-Identify the explanatory factors.

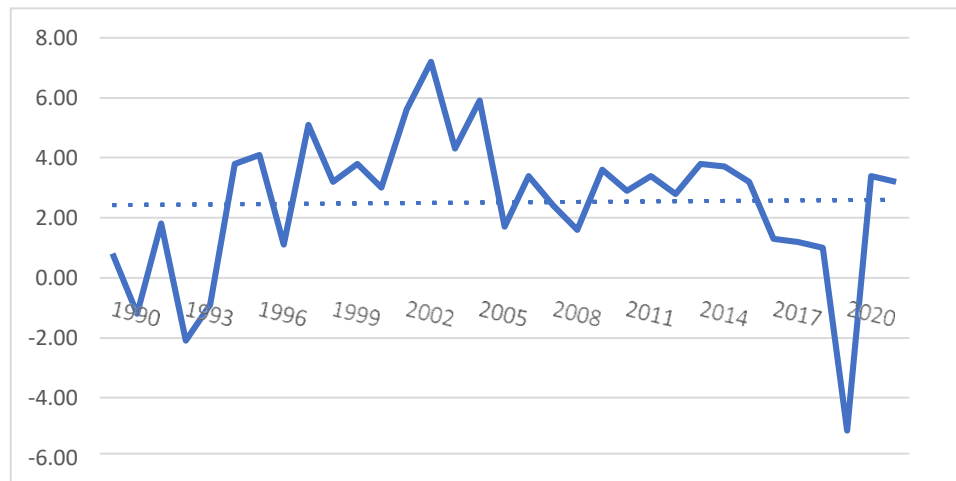
2- Reality of growth and development in Algeria:

Growth and development in Algeria has been influenced by various economic, social and political factors over the years. In this section, we will look at their evolution between 1990 and 2022 and try to find the explanatory factors:

2.1 Economic Growth in Algeria:

Economic growth in Algeria has fluctuated over the last thirty years, influenced by various internal and external factors, but the general trend was rather stable. (The trend is shown in dotted graph 01)

Graph 1: Evolution of the real GDP growth rate (1990-2022):



Economic growth in Algeria has fluctuated over the last thirty years, influenced by various internal and external factors, but the general trend was rather stable. (graph 01)

In the recent period, Algeria has faced economic challenges such as excessive dependence on hydrocarbon exports, volatile oil prices, as well as structural problems such as high unemployment and low economic diversification.

In general, economic growth in Algeria has been supported largely by oil revenues, but this dependence has also made the economy vulnerable to fluctuations in oil prices on world markets. Periods of high oil prices have often stimulated growth, while periods of low prices have had a negative impact on the economy.

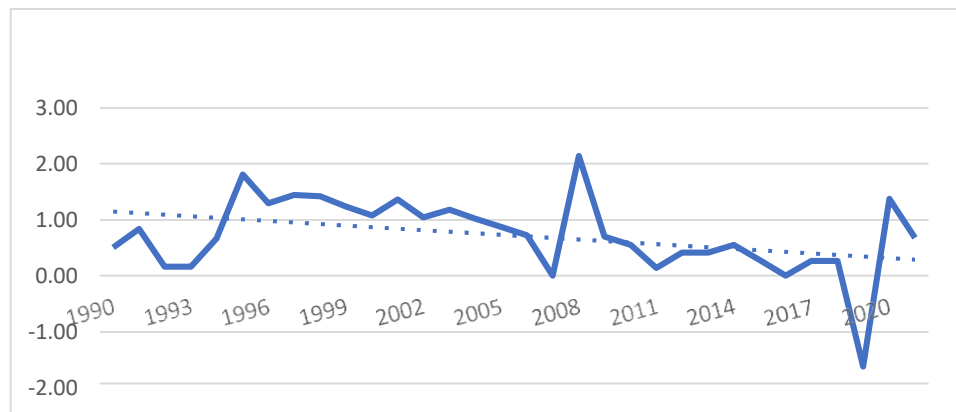
To diversify the economy and reduce dependence on hydrocarbons, Algeria has undertaken several economic reforms, including efforts to promote the private sector, encourage investment in sectors other than oil and gas, and improve the business climate. However, these reforms have often been slow to implement and have faced political and institutional obstacles.

In summary, economic growth in Algeria is influenced by the dynamics of the world oil market and by the government's efforts to diversify the economy and stimulate investment in non-oil sectors. Fluctuations in oil prices in the world market have a direct impact on economic growth in Algeria, according to the graph (top), economic growth was not strictly increasing, nor strictly decreasing, it was rather fluctuating.

2.2 Economic development in Algeria:

The Human Development Index (HDI) is a composite indicator that measures a country's level of human development by taking into account factors such as per capita income, life expectancy at birth and level of education.

Graph 02: Evolution of the human development index in Algeria (1990-2022)



However, according to data from 1990 to 2022, Algeria is ranked among the countries with average human development according to the United Nations Development Program (UNDP). Its HDI was generally located in the lower end of the spectrum of average human development countries. But it should be noted that the HDI recorded a negative trend over the period considered (the trend is indicated in dotted line in the graph 02)

Algeria has made significant progress in several areas of human development in recent decades, including poverty reduction, improved access to education and health care, and increased life expectancy. However, challenges remain, such as high unemployment, socio-economic inequalities and regional disparities.

3- Empirical study of the relationship between economic growth and the Human Development Index:

In this part, we will try to find empirical evidence of the relationship between economic growth as measured by real GDP growth rate and economic development as measured by the Human Development Index. For this, different techniques will be used.

3.1. / Data and sources:

The data used in the study are composed of the annual growth rate of real GDP (GDP in %) and the Human Development Index (HDI) in Algeria from 1990 to 2022. The real GDP growth rate is obtained from the World Bank's website at: <https://worldcdata.banqueale.org/indicator/NY.GDP.MKTP.KD.ZG?locations=DZ>

while the HDI is available on the website of the United Nations Development Programme (UNDP): <https://hdr.undp.org/data-center/country-insights#/ranks>

3.2/ Data analysis methods:

The following techniques were used in this study:

- The Pearson correlation coefficient

- Dickey Fuller Unit Root Test:
- Linear regression:
- The granger causality test:

3.3.Results and discussion:

In this part we will discuss the results of the econometric study.

3.3.1 The correlation:

| Correlation Matrix | | | |
|--------------------|----------|----------|--|
| | PIB | IDH | |
| PIB | 1.000000 | 0.222260 | |
| IDH | 0.222260 | 1.000000 | |

The correlation coefficient $r=0.22$ indicates a very low relationship between gross domestic product and the human development index.

3.3.2/Stationary series:

We start by choosing the number of lags (p)

| | GDP% | | HDI | |
|-----|--------|----------|--------|----------|
| | AKAIKE | Schwartz | AKAIKE | Schwartz |
| P=0 | 8,6 | 8,74 | -7,9 | -7,81 |
| P=1 | 8,71 | 8,85 | -7,6 | -7,69 |
| P=2 | 8,82 | 9 | -7,75 | -7,57 |
| P=3 | 8,91 | 9,15 | -7,76 | -7,52 |

It is clear that the number of lags that minimizes the AK and SC criteria is P=0 for both GDP and HDI series.

We will therefore apply the unit root test (ADF test) on the Pib (GDP) series with $p=0$.

Let's start with the model (3): with constant and trend

$$lpib = \alpha pib(-1) + \beta T + c$$

The test result is then presented:

| Augmented Dickey-Fuller Unit Root Test on PIB | | | | |
|---|-----------|--------------------|--|---------|
| ADF Test Statistic | -6.552091 | 1% Critical Value* | | -4.2712 |
| | | 5% Critical Value | | -3.5562 |
| | | 10% Critical Value | | -3.2109 |

*Mackinnon critical values for rejection of hypothesis of a unit root.

We note that: calculated ADF = -6.55 < tabulated ADF = -3.55

The H0 hypothesis of the existence of a unit root at the 5% threshold is rejected.

Moving to model (2): with constant

$$l\text{pib} = \alpha\text{pib}(-1) + c$$

| Augmented Dickey-Fuller Unit Root Test on PIB | | | | |
|---|-----------|--------------------|--|---------|
| ADF Test Statistic | -6.189472 | 1% Critical Value* | | -3.6496 |
| | | 5% Critical Value | | -2.9558 |
| | | 10% Critical Value | | -2.6164 |

*MacKinnon critical values for rejection of hypothesis of a unit root.

We note that: calculated ADF = -6.189 < tabulated ADF = -2.9

The H0 hypothesis of the existence of a unit root at the 5% threshold is rejected.

Moving on to model (1): no constant or trend

$$l\text{pib} = \alpha\text{pib}(-1)$$

| Augmented Dickey-Fuller Unit Root Test on PIB | | | | |
|---|-----------|--------------------|--|---------|
| ADF Test Statistic | -5.630008 | 1% Critical Value* | | -2.6369 |
| | | 5% Critical Value | | -1.9517 |
| | | 10% Critical Value | | -1.6213 |

*MacKinnon critical values for rejection of hypothesis of a unit root.

We note that: calculated ADF = -5.63 < tabulated ADF = -1.95

The H0 hypothesis of the existence of a unit root at the 5% threshold is rejected.

The GDP series is therefore flat.

Unit root test on IDH series:

We will therefore apply the unit root test (ADF test) on the IDH series with $p=0$.

Let's start with the model (3): with constant and trend

$$IDH = \alpha IDH(-1) + \beta T + c$$

The test result is then presented:

| Augmented Dickey-Fuller Unit Root Test on IDH | | | | |
|---|-----------|--------------------|--|---------|
| ADF Test Statistic | -0.061073 | 1% Critical Value* | | -4.2712 |
| | | 5% Critical Value | | -3.5562 |
| | | 10% Critical Value | | -3.2109 |

*MacKinnon critical values for rejection of hypothesis of a unit root.

We note that: $t_{\text{calculated}} = -0.06 > T_{\text{tabulated}} = -3.55$

We accept the H_0 hypothesis of the existence of a unit root at the 5% threshold.

Moving to model (2): with constant

$$IDH = \alpha IDH(-1)$$

| Augmented Dickey-Fuller Unit Root Test on IDH | | | | |
|---|-----------|--------------------|--|---------|
| ADF Test Statistic | -1.797514 | 1% Critical Value* | | -3.6496 |
| | | 5% Critical Value | | -2.9558 |
| | | 10% Critical Value | | -2.6164 |

*MacKinnon critical values for rejection of hypothesis of a unit root.

We notice that: $t_{\text{calculated}} = -1,79 > -2,95$

We accept the H_0 hypothesis of the existence of a unit root at the 5% critical value.

Moving on to model (1): no constant or trend

$$IDH = \alpha IDH(-1)$$

| Augmented Dickey-Fuller Unit Root Test on IDH | | | | |
|---|----------|--------------------|--|---------|
| ADF Test Statistic | 5.457807 | 1% Critical Value* | | -2.6369 |
| | | 5% Critical Value | | -1.9517 |
| | | 10% Critical Value | | -1.6213 |

*MacKinnon critical values for rejection of hypothesis of a unit root.

We note that: $t_{\text{calculated}} = 5.45 > -1.95$

We accept the H_0 hypothesis of the existence of a unit root at the 5% critical value. The process is therefore not stationary.

We will differentiate the HDI series only once

By the equation $DIDH = IDH - IDH(-1)$

and we test all three models:

Let's start with the model (3) with constant and trend

$$DIDH = \alpha DIDH(-1) + \beta T + c$$

| Augmented Dickey-Fuller Unit Root Test on DIDH | | | | |
|--|-----------|--------------------|---------|--|
| ADF Test Statistic | -5.326839 | 1% Critical Value* | -4.2826 | |
| | | 5% Critical Value | -3.5614 | |
| | | 10% Critical Value | -3.2138 | |

*MacKinnon critical values for rejection of hypothesis of a unit root.

The ADF value calculated = -5.32 < -3.56 at the threshold of 5%, we therefore reject the H0 hypothesis of the existence of a unit root.

Moving on to model (2): (with constant)

$$DIDH = \alpha DIDH(-1) + c$$

| Augmented Dickey-Fuller Unit Root Test on DIDH | | | | |
|--|-----------|--------------------|---------|--|
| ADF Test Statistic | -4.774965 | 1% Critical Value* | -3.6576 | |
| | | 5% Critical Value | -2.9591 | |
| | | 10% Critical Value | -2.6181 | |

*MacKinnon critical values for rejection of hypothesis of a unit root.

The ADF value calculated = -4.77 < -2.95 at the threshold of 5%, we therefore reject the H0 hypothesis of the existence of a unit root.

We are now testing the model (1) (without constant or trend)

$$DIDH = \alpha DIDH(-1)$$

| Augmented Dickey-Fuller Unit Root Test on DIDH | | | | |
|--|-----------|--------------------|---------|--|
| ADF Test Statistic | -2.822238 | 1% Critical Value* | -2.6395 | |
| | | 5% Critical Value | -1.9521 | |
| | | 10% Critical Value | -1.6214 | |

Note that ADF calculated = -2.82 < -1.95 at the 5% threshold, which means that there is no unit root in this model.

After the first differentiation the HDI series became stationary and we can now apply the different statistical tests.

3.3.3/ The Granger causality test:

First we choose the number of lags (p) that minimizes the AKAIKE and SCWARTZ criteria.

VAR Lag Order Selection Criteria
 Endogenous variables: DIDH PIB
 Exogenous variables: C
 Date: 04/14/24 Time: 17:07
 Sample: 1990 2022
 Included observations: 28

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | -10.95149 | NA | 0.008647 | 0.925107 | 1.020264 | 0.954197 |
| 1 | -1.113315 | 17.56818* | 0.005707* | 0.508094* | 0.793566* | 0.595366* |
| 2 | 1.518487 | 4.323675 | 0.006332 | 0.605822 | 1.081610 | 0.751275 |
| 3 | 2.136162 | 0.926512 | 0.008175 | 0.847417 | 1.513519 | 1.051051 |
| 4 | 2.925240 | 1.070893 | 0.010549 | 1.076769 | 1.933186 | 1.338584 |

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

According to the table above, the delay number that minimizes the two Akaike and Schwartz criteria is P=1, we will perform the causality test with this delay number. The results are presented in the following table:

Pairwise Granger Causality Tests
 Date: 04/14/24 Time: 17:19
 Sample: 1990 2022
 Lags: 1

| Null Hypothesis: | Obs | F-Statistic | Probability |
|---------------------------------|-----|-------------|-------------|
| PIB does not Granger Cause DIDH | 31 | 19.9323 | 0.00012 |
| DIDH does not Granger Cause PIB | | 0.15942 | 0.69272 |

According to the result of the Granger test, the null hypothesis (H0: PIB does not granger cause DIDH) is rejected because the probability $P=0.00012 < 0.05$. Which means that GDP causes HDI.

While the second hypothesis H0: DIDH does not granger cause PIB is accepted because the probability $p = 0,69272 > 0.05$.

The relationship between the two stationary variables GDP and DIDH goes in a single direction «GDP causes the HDI»

3.3.4 / Linear regression:

From the results of the Granger test, we will estimate the Human Development Index (HDI) according to the growth rate of gross domestic product (GDP) by the equation:

$$DIDH = aPIB + bT + C$$

GDP: the growth rate of gross domestic product in %.

DIDH: the human development index differentiated only once.

T: trend or trend.

C: the constant.

The result of the estimate is presented in the following window:

Dependent Variable: DIDH
 Method: Least Squares
 Date: 04/20/24 Time: 14:17
 Sample(adjusted): 1991 2022
 Included observations: 32 after adjusting endpoints

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| PIB | 1.65E-05 | 4.87E-05 | 0.339782 | 0.7365 |
| @TREND | -0.000165 | 9.02E-05 | -1.834426 | 0.0769 |
| C | 0.007386 | 0.001656 | 4.459123 | 0.0001 |
| R-squared | 0.104297 | Mean dependent var | | 0.004750 |
| Adjusted R-squared | 0.042524 | S.D. dependent var | | 0.004670 |
| S.E. of regression | 0.004569 | Akaike info criterion | | -7.849823 |
| Sum squared resid | 0.000605 | Schwarz criterion | | -7.712410 |
| Log likelihood | 128.5972 | F-statistic | | 1.688401 |
| Durbin-Watson stat | 1.875280 | Prob(F-statistic) | | 0.202478 |

a/The coefficient of determination (R squared):

The coefficient of determination R^2 measures the degree of determination of the variable DIDH by the explanatory variables.

$R^2=0.10$ indicates that our model explains only 10% of HDI variation, which probably means that we are dealing with a bad model.

b/Global significance of the model coefficients:

We will test the quality of the coefficients of the model taken together, asking us the hypotheses:

$H_0: a=b=0$

H_1 : there is at least one coefficient different from zero.

| | |
|-------------------|----------|
| F-statistic | 1.688401 |
| Prob(F-statistic) | 0.202478 |

We use the Fisher test (indicated in the table above). The p-value associated with the Fisher statistic $=0.202478 > 0.05$

We accept H_0 and reject H_1 which stipulates that at least one of the coefficients of the model is different from zero.

So it's a bad model.

c/ significance of individual coefficients:

We use the Student:

Let's start with the coefficient (a) of the explanatory variable (GDP)

H0: a=0

H1: a is different from zero

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| PIB | 1.65E-05 | 4.87E-05 | 0.339782 | 0.7365 |

We note that the P-value associated with this statistic =0.7365 > 0.05

We accept H0 and we reject the hypothesis H1 which says that the coefficient of a is different from zero, so it is not significant at the 5% threshold.

The two tests of global and individual significance, as well as the low coefficient of determination, show that the variable GDP has no effect on the variable HDI.

4. Conclusion:

Through this study, we wanted to investigate the existence of a relationship between economic growth measured by the growth rate of Gross Domestic Product and economic development measured by the Human Development Index.

According to data from Algeria from 1990 to 2022, the rate of economic growth was fluctuating with a stable trend, which allows us to refute the first hypothesis that assumed a positive evolution of this indicator. Our study also showed that the evolution of the HDI was fluctuating with a general negative trend over the research period, which allows us to refute the second hypothesis that stipulated that the HDI experienced positive growth.

For the study of the relationship between GDP growth and HDI, we first calculated the correlation coefficient which was very low (r=0.22) showing the weakness of the linear relationship between the two variables. Then, after stationing the study variables, we performed a Granger causality test to see if one variable causes the other. This test showed that the variable PIB causes the variable HDI.

Based on Granger's test results, we regressed the HDI variable to the GDP variable using the ordinary least squares method to measure the impact of the economic growth rate on the HDI. Using the Fisher and Student tests and

with a low coefficient of determination, we concluded that the specified model was not good.

The results of our study finally allow us to say that there is no relationship between economic growth and the human development index in Algeria.

Explanatory factors: Growth does not lead to human development in Algeria because :

- ▶ Economic growth in Algeria is not inclusive, it does not provide opportunities for socio-economic development for as many people as possible, such as that young people, women and the rural population;
- ▶ It can be explained by bad governance and corruption;
- ▶ The rentier character of the Algerian economy which escapes all the rules and contents of economic theory.

Statistically speaking, it may be that linear modeling is not the right one so no linear relationship, but there could be a relationship of other type which will require further research.

Bibliography:

-Van den Berg, H. (2016). *Economic growth and development*. World Scientific Publishing Company.

-Belgacem, T. (2016). Les ressources de l'Algérie. *Outre-Terre*, 47, 152-164. <https://doi.org/10.3917/oute1.047.0152>

-Huart, J. M. (2003). *Croissance et développement*. Editions Bréal.

-Gadrey, J. (2002). De la croissance au développement à la recherche d'indicateurs alternatifs. *FUTURIBLES-PARIS*-, 39-72.

-Bettelheim, C. (1960). Modèles de croissance et développement économique. *Revue Tiers Monde*, 3-16.

-Feldstein, M., Horioka, C., & Savings, D. (1992). The Solow growth model. *Quarterly Journal of Economics*, 107(2), 407-437.

-Guellec, D. (1992). Croissance endogène: les principaux mécanismes. *Économie & prévision*, 106(5), 41-50.

-Pottier, P. (1963). Axes de communication et développement économique. *Revue économique*, 14(1), 58-132.

