**Question 1.**

Forecasting the future oil price is very important for managers while taking operational decisions like the quantity to product, time to purchases, type of transportation, reduce costs, increase profile and enhance competitive advantage, etc. However, this exercise is very complicated because of the nature of this product and its geopolitical strategy, making its movement is unknown to capture because of its nonlinear characteristics.

The volatility of the Oil prices have a significant impact on the global economy, albeit the consequences vary based on times, geographies, industries, the cause of the oil shock, and other factors. Various perspectives on the influence of oil price variations on the global economy have being proposed. The dramatic reduction in crude oil prices in recent years has taken many governments and businesses off guard, leaving them struggling to deal with the economic and financial consequences.

In this work, we demonstrate two existing oil price forecasting literature techniques, both methods are quantitative include econometrics and computational approaches, the econometric methods are grouped into the three classes of models, Time series, Financial models and Structural models,

Recently, and with the development of computational techniques. Artificial Neural Networks (ANN) and Support Vector Machine (SVM), become widely used by researchers because the large data and its accuracy.

The econometric models based on past data or the historical data using mathematical methods with the focus on short and medium term forecasting. Among the previous mentioned econometric models. The Time Series approaches are the most frequently used.

Time series methods forecast the future prices through the past data. Those models assume that the future price values deduced from its past values. However, using this methodology need a strong assumption such:

The data needs to have a systematic behavior; this pattern can be detected using autocorrelation function. The second assumption is the interaction of the independent variables that needs to have a strong correlation to construct a structural model. The third one is the significant relation between the independent variable and the dependent variable (Oil Price).

In the time series methods, we find three main categories: exponential smoothing models, auto-regression (AR) and naïve models. Most used one for oil price forecasting are (ARIMA, ARCH/GARCH).

Although, the predicting power of those models, they failed to do the job. In addition, that because of nature of price oil that relate to its nonlinearity (the ARIMA model capture the time series linear characteristics) and the strong volatility of crude oil market and its chaos. Therefore, researchers demonstrate that those models failed to describe many specific characteristics of crude oil price.

Recently, and with advance technological of computation capability of computer (Parallel Processing Power) and the existing large data sets (Big Data). A new breed of models become widely used by markets, government, scholars, etc. Those unconventional methods are non-linear approaches. However, the previous models assume that the process (Crude oil price) under study is linear process, which is totally wrong. On the other hand, Non-standard methods such ANN can handle with the non-linear and chaos process.

The ANN show promising power to classify and predict volatile process with strong pattern recognition capabilities. Many scholars compared the classical methods that need a long time series data with the new one, found a high accuracy in term of classification, predicting and regression analysis.

Artificial Neural Networks techniques are more complex and can deal with a large scale of data from various sources. Shows a great ability in modeling and forecasting non-linear variables and noise data. Their results shows that the predicting accuracy is superior compared to conventional techniques. The ANN based on Artificial implementation can learn from data complex relation that failed to capture by its successor models.

However, the ANN tend to have some inconvenient reported by many researchers. Although, the Artificial Neural Networks models shows some weakness in their performance in some situation and becoming inconsistent. For example, when there is exogenous event like war in oil producing countries, election, geopolitical, trader’s speculation, etc. the ANN failed to capture those entire events that effect the Oil price directly. For example, the civil war in Libya in 2011 and its impact in prices.

In addition, the ANN can become overfitting sometimes, other problem is, nonstationary variables that need preprocessing of the input. Making using ANN easily and in real time forecasting a strong obstacle.

In addition, ANN needs a high level of hardware, having a processors with parallel processing power (ppp) is very expansive for s mall firms and with limited budget. As we mentioned above, some event are difficult to model and predict. In light of this, implementing those events as inputs in ANN is very complex and need precoding steps (translate events and problems to numerical values before introducing it to the model). This step is full of measurement error affecting its accuracy and then its effectiveness in real world.

But we can’t ignore its advantage, which allows us to process a very large data set related to Oil price. With the advance in ANN, algorithms to correct certain failure and making them work faster and use Big Data in real time forecasting. Be considered as breakthroughs in the development of new algorithms.

The major problem for those techniques of forecasting, such as ANN. Is their “Black Box” algorithms. No one knows the output or the process caused the model to arrive to this prediction. Making the interpretability of results is a serious problem for researchers and investors. Because of its “Black Box” nature, those algorithms stays hidden from researchers and policy makers to investigate, regulate, controlee, interference, etc. programmed with one goal is making profits. Whatever the consequences in real word. Leading to future financial crisis according to experts.

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**Question 2.**

Morocco has had to rely on natural gas imports to expand its economy since it lacks the hydrocarbon resources. This has exposed the country to worldwide energy price changes and non-manageable exogenous shocks, affecting the nation budgetary condition leading to external debt. A handful of steps to lessen reliance on energy imports, on the other hand, many measures was taking by the government to reduce it dependency on energy imports.

Even the attempt to reduce its decency to natural gas by investing in renewable energy sources (Centrale Solaire Thermodynamique NooR in Ouarzazate), the kingdom still exposed to global volatility of energy prices making the forecasting tool is necessary for policy makers.

Researchers tend to use Exponential Smoothing, ARIMA, and Temporal Causation Modeling. For energy demand forecasting. In recent paper by **Nafil et. al (2020),** provided elements for government and private sector about the future demand and production of energy. The results showed that only the Temporal Causal Modeling model is valid in the Moroccan context. The problem with this model is that take the consumption as dependent variable, and the time as independent variable. Making it very weak and unrealistic the behavior and the complexity of the variable. Regarding its nature correlation with other fossil energy sources.

The SVAR model, provide a promising results according some papers. Using SVAR to model the interdependcies between the natural gas demand and the relevant transmission channels effecting its price and fluctuations. It can used in Morocco’s case.

The following model was adapted from the work of **Nick, S, et.al (2014).**

The price of Brent is an important factor that affect natural gas demand, Policy and Regulation , supply shortfall volume due to specific events, HDD heating degree-days deviation (Temperature) as Normal heating degree-days in Census district, CPI consumer price index in the country, energy efficiency, .

(There are other variables to be included like, industrial structure or the complexity indicator, price of other derivative energetic product, etc).

GDP growth: GDP growth is one of the key drivers of natural gas consumption, which is mostly sourced from energy demand in the power generating and industrial sectors. As the economy develops, so will the need for energy as a factor of production. This component is relevant in both producing and consuming countries. The most energy-intensive industries, particularly for natural gas, are manufacturing and electricity production.

Population growth will increase the demand for energy and natural gas, and will have long-term implications for gas demand. More than 1.2 billion people now lack access to electricity, and population increase is cited as one of the key drivers in many energy forecasts throughout the world. Because we are concentrating on a short-term perspective, we do not include population expansion as a long-term driver of energy demand.

Policy and Regulation: Policy and regulation can have a direct or indirect impact on natural gas consumption. In certain countries, such as Iran, policies have been formed to promote natural gas usage as an alternative to coal and oil in the energy mix. However, several advanced countries, such as the United Kingdom, Germany, and Japan, pay large subsidies to promote renewable energy over fossil fuels. To address air quality challenges, China's current energy strategy has emphasized the use of clean energy sources such as natural gas, renewable energy, and nuclear power. Energy demand and pricing are used to simulate this element implicitly.

Technology advancements have the potential to influence the overall energy usage and mix. Changes in demand structure are influenced by how technology evolves, what difficulties it faces, and where cost is a factor (e.g., renewable energy intermittency, power storage batteries, CCS & CCUS, ...). We haven't explicitly addressed this parameter in our model because it has a long-term influence.

Energy efficiency: Improvements in energy efficiency and conservation can have a negative impact on demand for energy and natural gas in each industry. This has been observed in some countries, such as China and the OECD, where there has been a decoupling of GDP growth from energy use in recent years.

By including the instantaneous restriction that specify the SVAR model. The necessary for a matrix of instantaneous interaction.

Table: The identification of the instantaneous restriction matrix.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | The price of Brent | supply shortfall | HDD | CPI | GDP growth | Policy and Regulation | Technology |
| The price of Brent | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| supply shortfall | \* | 0 | 0 | 0 | 0 | 0 | 0 |
| HDD | \* | \* | \* | 0 | 0 | 0 | 0 |
| CPI | \* | \* | \* | 0 | 0 | 0 | 0 |
| GDP growth | \* | \* | \* | \* | \* | 0 | 0 |
| Policy and Regulation | \* | \* | \* | \* | \* | \* | \* |
| Technology | \* | \* | \* | \* | \* | \* | \* |

Notes: Each row of this table indicates an equation in the VAR model with the respective dependent variable. Each column indicates the instantaneous impact of a variable in each equation. The ⋆ denotes that a parameter is estimated from the data and that the model allows for an instantaneous relationship, whereas a 0 indicates that the according parameter is restricted to zero.

We employ the instantaneous limits necessary for identification for lagged connections with the following exceptions: first, the supply deficit variable is assumed to be strictly exogenous, i.e. not impacted by lagged temperature changes (HDD). Second, we allow for cross-commodity price (Price of Brent) impacts in all directions since, in our opinion, crude oil prices do not need strict erogeneity a priori.

Third, the heating degree-days process is modeled as a first-order autoregressive process with no lag in crude oil and coal pricing. Temperature impacts on commodity prices, we believe, are only short-term. We also let INGC, CPI, and natural gas pricing can influence by the delays of all other factors.

This structural model allows us to account for both the dynamics of the natural gas market and the interaction with other commodities markets with other factor that affect the natural gas demand like the CPI.

Natural gas consumption, like that of other energy sources, is driven by demand for energy services in a variety of sectors, including residential, industrial, power generating, and transportation. In other words, natural gas demand generated from energy demand; therefore, the variables that drive energy demand may influence natural gas demand also.

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**Question 3.**

La logistique à température contrôlée (ou en anglais Temperature-controlled logistics) concerne le stockage, la conservation et le transport de marchandises sensibles à la température et qui doivent être maintenues à une température spécifique. Ceci est essentiel pour de nombreux produits pharmaceutiques, car les médicaments pourris peuvent avoir des effets majeurs sur la santé et la sécurité.

Des températures élevées ou inférieures à zéro peuvent avoir un effet sur la stabilité chimique du médicament et peuvent même modifier ses qualités physiques. Cela peut prendre la forme d'une sédimentation et d'une séparation du système d'émulsion.

En raison des conséquences des médicaments mal conservés, les normes réglementaires sont devenues plus strictes et les entreprises pharmaceutiques doivent être en mesure de démontrer que leurs marchandises sont transportées via une chaîne d'approvisionnement à température régulée.

De nombreuses entreprises ont créé leur propre infrastructure et systèmes TCL captifs dans des régions où l'offre de TCL par des tiers est insuffisante. Au Nigeria, par exemple, pratiquement toutes les activités de TCL sont réalisées en interne en raison du manque d'investissements dans les installations multi-utilisateurs par des prestataires de services tiers dignes de confiance.

Cela offre l'avantage de permettre à chaque organisation de concevoir son système TCL selon ses propres exigences, mais le système interne est coûteux.

Les services TCL tiers peuvent améliorer l'efficacité, la fiabilité et la qualité du service, ainsi que produire une valeur ajoutée pour toutes les entreprises qui utilisent la chaîne du froid, y compris les industries alimentaire et pharmaceutique. Le développement de ces services est un élément susceptible d'améliorer l'efficacité, la fiabilité et la qualité du service, ainsi que de produire une valeur ajoutée pour toutes les entreprises qui utilisent la chaîne du froid, y compris les industries alimentaires et pharmaceutiques.

Optimisation des coûts d'exploitation : les services tiers peuvent regrouper la demande provenant de nombreuses sources, en réalisant des économies d'échelle et en équilibrant les fluctuations saisonnières.

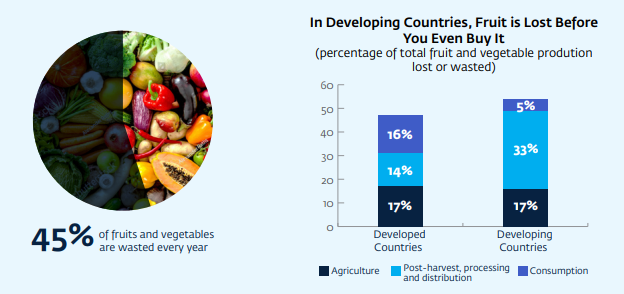
• Orientation stratégique : les producteurs et les fabricants peuvent se concentrer sur leur activité principale tout en achetant des services TCL sur une base flexible à des prix variables.

• Accès à des professionnels : les prestataires de services TCL tiers peuvent mettre en œuvre plus facilement des améliorations de la qualité de service fournies par des spécialistes externes.

• Une plus grande adaptabilité : les fournisseurs tiers sont plus réactifs aux conditions changeantes du marché et ont un meilleur accès aux développements technologiques.

• Diversification des risques : En utilisant des services tiers, les producteurs et les fabricants évitent le risque de dépenses en capital ou d'investissements dans des actifs physiques.

En ce qui concerne la logistique des vaccins, plusieurs pays ont passé des contrats avec des entreprises spécialisées du secteur privé pour gérer la chaîne d'approvisionnement et la logistique des vaccins. L'externalisation cherche souvent à réduire les coûts, à conserver des ressources publiques limitées, à accroître l'efficacité et à mieux concentrer les efforts du gouvernement sur la planification et l'élaboration des politiques. Certains gouvernements ont choisi de louer des camions réfrigérés et de l'entreposage au secteur privé comme solution à court terme pour résoudre les pénuries de véhicules.



Source : Note par, Christian Ksoll, Daniel Pulido, Harsh Gupta « LOGISTICS À TEMPÉRATURE CONTRLÉE : Essentiel pour la santé et la croissance », Société financière internationale, une organisation membre de la Banque mondiale

Selon une étude de l'OMS, l'externalisation de la logistique de vaccination à des sociétés commerciales spécialisées par le biais de partenariats public-privé a entraîné des améliorations significatives en termes de qualité et de coût en Thaïlande et dans la province du Cap occidental en Afrique du Sud.

Les programmes sud-africains et thaïlandais ont signalé des dépenses de chaîne d'approvisionnement externalisées de 6 % et 5 % du coût de la vaccination, respectivement, contre 28 et 31 % pour les chaînes d'approvisionnement internes.

Sans TCL, le commerce des produits agricoles est souvent confiné à une petite région géographique. Les vendeurs peuvent vendre leur récolte considérablement plus loin grâce à l'infrastructure moderne de la chaîne du froid. Un autre avantage de l'utilisation du TCL est que les agriculteurs ne sont pas obligés de vendre toutes leurs récoltes immédiatement après la récolte, mais peuvent vendre leurs produits lorsque la demande et les prix sont forts. TCL contribue donc à la stabilité des revenus des ménages agricoles.

Un TCL bien géré peut également minimiser les déchets et, par conséquent, rendre les produits de consommation plus sûrs. TCL aide à la préservation des nutriments alimentaires puisque les vitamines sont mieux conservées dans une atmosphère froide et stable.

Malgré la qualité supérieure qu'un environnement à température contrôlée peut donner aux produits frais, le coût élevé du maintien d'une chaîne du froid idéale pourrait diminuer la compétitivité des produits, car les clients des pays émergents sont souvent réticents ou incapables de payer un supplément pour de tels produits. Les investissements durables dans la chaîne du froid nécessitent un mélange diversifié de biens à valeur ajoutée pour ancrer l'investissement et assurer un niveau particulier d'utilisation des actifs.

Références :

Christian Ksoll, Daniel Pulido, Harsh Gupta « LOGISTICS À TEMPÉRATURE CONTRLÉE : Essentiel pour la santé et la croissance », Société financière internationale, une organisation membre de la Banque mondiale.

**Question 4**:

Understanding our own biases and how our experiences and values impact the lens through which we perceive our environment is one part of more successful communication with a varied audience. We can't presume that everyone else thinks the same way we do.

This mistaken belief divides us from our audience and frequently considered as ethno-centrist. We must research our audience and carefully scrutinize our words and actions to ensure that nothing in our presentation implies that we feel our approach is better to how another culture functions.

One of the first things to do is the practicing of reflective listening in relation to corporate objectives and goals.

It is critical to take the time to listen and ask relevant questions in order to genuinely understand each other and communicate authentically. This process takes longer than conversation between two people from the same ethnic group and background, but the time invested can provide major emotional rewards.

Listening improves one's capacity to speak coherently and to comprehend individuals and organizations from other ethnic groupings. Finally, because problems are more quickly remedied in an adaptable, responsive work environment, this saves time in the future.

Listening is a talent that takes practice and patience to master. Pay close attention to others, take notes, and let information sink in before answering. By digesting the material first, you will be able to construct an acceptable answer that takes into consideration diverse ethnic groups and gender differences in the workplace.

Finding successful communication methods in a diverse workplace is frequently a simple issue of mindset. A pleasant attitude toward coworkers is a terrific place to start. Genuine purpose is also beneficial since you genuinely care about maintaining an open, meaningful channel of communication in order to accomplish fruitful results.

In business, simply approaching interactions with an open mind and a desire to listen is often enough to acquire respect and have reciprocal discussions. Positive attitudes are contagious and beneficial to all parties involved.

Concentrate on applauding excellent work rather than using a condescending tone or punishing faults. Use that energy to promote long-term learning and progress. Taking the time to praise outstanding work while also fostering good morale around the achievement of a varied group will foster a team attitude.

Although a pleasant, outgoing attitude is ideal for communicating, body language should also be examined. When engaging with people from diverse cultural backgrounds, your body language is very crucial.

Touching is strictly prohibited in the workplace. Touching may easily be construed as sexual harassment, and it also causes discomfort in certain people. Outside of the fundamental handshake, keep your hands to yourself in a business atmosphere. The sole exception is between longstanding friends who are both at ease with a hug or slap on the back. However, unless you are very positive, stick to simple formalities.

Again, the context and level of familiarity with the other persons involved are critical.