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Generativity is a Core Value of the ESJ: A Decade of Growth

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century[1]. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

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[1] Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:http://dx.doi.org/10.1037/0003-066X.50.9.796

generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

Sincerely,

Daniel B. Hier, MD

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Table of Contents:

Asset Volatility and Financial Sustainability

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Abstract

This study observes how companies' fundamental-based asset volatility impacts their financial sustainability. Accounting literature documents that net assets value accumulates previous earnings management. The asset balance change reflects biased earnings measurement, and abnormal asset fluctuation signals aggressive earnings management. This paper uses delisting as a proxy to observe how asset volatility can interact with abnormal earnings fluctuation to impact firms' sustainability. The study uses two groups of regression and a Principal Component Analysis (PCA) Logistic Regression approach to observe how asset volatility impacts companies' delisting risk. It borrows the Six Sigma methodologies to measure the volatility of financial statement items. Then the PCA analysis reduces the data dimensions to twelve factors. The analysis shows that assets' abnormal fluctuation is a risk signal concurring with the extant earnings management literature. One takeaway from this study is that companies must disclose detailed explanations if asset volatility is beyond a red line. As Statement of Financial Accounting Standards (SFAS) 151 requires direct disclosure of abnormal excess capacity costs, companies must disclose abnormal asset volatility. The paper contributes to the literature from two perspectives. First, this paper captures firms' sustainability from the accounting perspective with fundamental measures from quarterly financial reports. It provides a comprehensive way to detect aggressive earnings management risks. Second, the PCA logistic regression model offers a comprehensive analysis to derive useful information from many attributes.

Keywords: Financial Sustainability, Companies' Delisting, Six Sigma Metrics, Earnings Management, PCA Logistic Regressio

1.   Introduction

The articulation between the income statement and the balance sheet ensures that the net asset value accumulates the effects of previous accounting choices and biased assumptions reflected in earnings (Barton & Simko, 2002; DeFond, 2002). Discretionary accruals must be reversed in the future, so the reverse feature and its speed must be reflected in the balance change of asset items (Abernathy et al., 2014). Thus, abnormal asset fluctuation should be reflected as a risk signal. This paper aims to observe companies' sustainability with fundamental balance sheet information. The accounting mechanism makes the information flow within the system and can be traced after the resources enter the accounting loop. However, the General Accepted Accounting Principle (GAAP hereafter) allows accounting information to have discretions to deal with uncertainty. These discretions allow accountants to smooth earnings by fluctuating assets (Dechow & Schrand, 2004). An example frequently cited in the literature is that the sale and leaseback of fixed assets can easily record a gain and eliminate assets from the balance sheet (e.g., Nelson et al. 2002). This manipulation only changes accounting numbers: the fixed assets are still used as they were before the sale. However, this aggressive manipulation will lead to abnormal asset fluctuation.

This study uses comprehensive data analytics to filter performance from earning management and signal potential sustainability risks. The analysis derives factor measurement from financial statement items to predict companies' sustainability.

In the cyclical accounting loop, assets are the critical bridge within the accounting information reporting system. The accounting logic is straightforward, but the definition from the GAAP and Financial Accounting Standard Board (FASB) does not clearly enough distinguish assets from expenses. This vagueness leads to the challenges of justifying the recognition of assets that have little relevance to an assessment of the financial position of an enterprise (Scheutez, 1993; Samuelson, 1996). The ambiguity unavoidably leads to discretion in accounting regulations, especially rule-based ones. In the GAAP framework, managers have discretions in classifying and summarizing economic transactions (Zhou et al., 2022). Earnings management literature documents many problems in accounting practice and regulations, and the relationship between firms' value and annual earnings has decreased (Dechow & Schrand, 2004).

A general introduction to the theoretic mechanism of earnings can help recall the nature of earnings management. Assets are the economic resources that act as costs awaiting assignment to future revenues (Paton & Littleton, 1994). A balance sheet is a sheet of balances created as a by-product of the matching process (Dechow & Schrand, 2004). All assets will become expenses to match revenues, and by doing so, assets can demonstrate the

nature which leads to future benefits. The literature has a tremendous amount of research that claims managers take the discretions to manipulate earnings for their interest. Especially, managers use accounting accruals to boost or smooth earnings (Zimmerman et al., 1988; Jones, 1991; Dechow, 1995; Dechow & Dichev, 1996; Sloan et al., 2001). These studies mostly focused on the income statement because information users cherish earnings more than other items (Ross, 1977). Earnings are the "bottom line" and are widely believed to be the premier information item in financial statements. Economic theory ascribes corporate earnings as a signal optimally directing resource allocation in capital markets (Lev, 1989; Beneish, 2001). This trend pressures company management to provide smooth earnings to signal the companies' future sustainability. Earnings management tries to take advantage of the directions from GAAP to report smooth earnings when genuine business operations suffer volatility. One frequently used strategy is to use assets' abnormal volatility to smooth earnings. These behaviors were coined as real earnings management or accounting-generated earnings smooth (Dechow & Schrand, 2004; Roychowdhury, 2006).

This study uses archive studies to filter accounting-generated earnings performance and signal potential sustainability risks. From a long-term perspective, this accounting-generated performance (real-activity earning management or accrual-based earnings management) can be separated from real corporates' sustainability. The paper uses companies' delisting as a proxy of companies' sustainability. The study finds that fixed assets' abnormal fluctuation is considered a clear risk indicator. The abnormal fluctuation of long-term assets signals the risk that companies use accounting-generated earning management to manipulate earnings. From the policy-making perspective, companies have an obligation to disclose abnormal asset volatility. This disclosure can force management away from using long-term assets to manage earnings.

2.   Literature Review
2.1.   Earnings Manipulation and Assets Volatility

Prior research documents evidence that management manipulates earnings to meet stakeholders' expectations. There is a discontinuity of current around zero earnings and the previous year's earnings (Hayn, 1995; Burgstahler & Dichev, 1997; Degeorge, Patel & Zeckhauser, 1999; Jacob & Jorgensen, 2007). This discontinuity is interpreted as evidence of earnings management by firms to meet or slightly beat earnings benchmarks. The literature documents three main motives to manipulate earnings: contractual motivations, capital market impacts, and implying hints to stakeholders. Bounded rationality theory implies that the capital market influences firms' stock values by firms' earnings as a signal. These motivations show that most

manipulation behaviors aim to show a steady firm's performance, called "smooth reported income" in the literature (Copeland, 1968, pp 101). Even though these behaviors have different actions, the common goal is to use the discretions from the GAAP, or take fraudulent actions, to report a steady firm's performance in their interest (Zimmerman & Watts, 1986).

Earnings quality is a theoretical construct, and it shows that GAAP allows managers to adjust how to report their operational results. This study treats earnings manipulation as an abstract concept, not some specific actions. The literature documents two kinds of earnings manipulation: The first is accrued-based earnings manipulation (Jones, 1991; Dechow et al., 1998, 2006; etc.). The second is real earnings manipulation (Cohen et al., 2008, 2011). We cannot have a one-fit-all regulation to stop earnings management because the manipulation strategy is dynamic. Managers can always have an innovative scheme to avoid violating regulations. The regulations delegated by the Sarbanes-Oxley Act of 2002 (SOX) are mostly related to accrual-based earnings management. While pro-regulatory theorists argue that stronger regulation is needed to solve the manipulation issues, Ribstein (2002) stated that regulation cannot offer a solution. The regulatory changes or new regulation (e.g., the Sarbanes-Oxley Act of 2002) may trigger firms to switch from one mechanism, i.e., accrual-based earnings management, to a new method, say real "earnings-management techniques" (Cohen et al., 2008, p. 759). The new methods likely can be more costly to shareholders and are harder to detect.

When we trace the earnings manipulation over a lengthy period, whatever the manipulation mechanisms the managers would take, the dynamic path of asset changes must have high abnormal fluctuation features. The literature demonstrated similar research results. Francis et al. (1996) provided two pieces of evidence consistent with a strategic element to the timing of special charges. First, they documented that write-offs follow poor abnormal stock return performance. Second, they found that crucial management changes occur concurrently with asset write-offs (including goodwill, Plant, Property &Equipment) and restructuring charges but not with inventory write-offs. Correia et al. (2018) documented that asset volatility is significantly positively associated with the probability of bankruptcy from creditors' perspective. Moreover, the robust evidence shows that these fundamental volatility measures improve out-of-sample and help explain cross-sectional variation in credit spreads.

Beneish (1999) proposed a concept of asset quality index (AQI), which is calculated as the ratio of non-current assets other than property plant and equipment (PP&E) to total assets in a given year. The AQI "captures distortions in other assets that can result from excessive expenditure capitalization" (Beneish et al., 2013, p. 76) and quantifies "the proportion of

total assets for which future benefits are potentially less certain" (Beneish, 1999, p. 26). High AQI values could signal a company's increased involvement in cost deferral by shifting expenses onto its fixed assets.

Richardson et al. (2010) called studies that can utilize contextual information such as industry, sector, and macro-environmental data to forecast future earnings, cash flow, risk, and value to observe how abnormal assets' volatility impacts firms' sustainability. They also called for research to exploit the wealth of information contained in general-purpose financial reports. My paper documents evidence using industrial-based assets and earnings volatility to observe how the information in financial statements can predict companies' sustainability with delisting as a proxy.

2.2.   Delisting stocks

It is a signal of unsustainability when companies delist from the stock market. Macey et al. (2008) documented quantifiable evidence that the share prices of delisting companies fall by half percentage spreads on average triple, and volatility almost doubles when delisting occurs. Fungáčová & Hanousek (2011) explained that there are two types of delisting: voluntary and involuntary. A company's voluntary delisting is intentional or, at their request, removing the shares from the capital market index or the stock market is executed. In this case, the company decides to change the form of a company from a publicly listed company or go public to a limited company. The decision must get approval from at least 75% of the shareholders' meeting. Involuntary delisting is also called compulsory delisting. It is the issuance of stock from the market index capital, and it is not based on the decision of the issuing company. The capital market authorities and regulations decide to exclude a company's shares from the stock index (Bakke et al., 2012). This study focuses on the second type, which signals that the delisting companies have sustainability issues. The delisting companies were on the COMPUSTAT list (a comprehensive database of fundamental financial and market information on active and inactive global companies, indices, and industries) from 2006 through 2019. However, they cannot be found on the list at the end of 2019. A follow-up check confirms a firm is a delisting company if Yahoo Finance shows the company is a private company with a price lower than one dollar or is merged into other firms. The delisting risk could come from an operational loss or earnings management-led control risks.

3.   Methodology

This paper takes two studies to test the hypotheses. The first test uses two groups of regressions to observe how asset volatility relates to earnings volatility. The second test is a PCA logistic regression to determine how asset

and earnings volatility impact a company's delisting. The proposed novel approach breaks down the assets' abnormal fluctuation and observes how the volatility features relate to risks. The rationale is that all assets will become expenses. The nature of aggressive earning management behaviors (sometimes bad even fraud activities) is to manipulate the fluctuation level or the speed of the transformation and reversion.

3.1. Hypothesis Development

One essential feature of earnings management is that manipulated earnings must be reversed in future years (Abernathy et al., 2014). Because of this accounting mechanism, the manipulation will be reflected in the signals of abnormal fluctuation of asset change no matter the manipulation approaches management use. Assets' abnormal fluctuation is considered an indicator of risk. The reflected risk could be an inherent risk regarding business operations, and it also may be a control risk regarding how a company uses internal controls to supervise aggressive earnings management. When a company suffers decreased operating earnings, management has pressure and motivation to smooth earnings. If the firm's internal control is weak, management can manipulate earnings by fluctuating other financial accounts, like assets. This study uses financial statement information to retrospectively observe whether abnormal asset fluctuation can and how it can lead to earnings management and sustainability risks.

There is a closed loop between assets and expenses; the assets (long-term or short-term accruals) will fluctuate when management uses non-normal-operating ways to make earnings persistent and smooth. This notion is expressed as Continuity Equation (CE hereafter) in the auditing area (Allies et al., 2006; Kogan et al., 2014). CE is a mathematical expression often used in physics to express various conservation laws. Allies et al. (2006) borrow this term to construct audit benchmarks that can capture the dynamics of the fundamental business process of a firm. Kogan et al. (2014) take three mathematical equations, including a simultaneous equation, a vector autoregressive model, and a linear regression model, to capture the anomalies on the transactional data level. It must be fulfilled once a tendency is set in motion in closed conditions.

A business's abnormal assets' fluctuation captures its excessively volatile operations. Many factors could cause the abnormal fluctuation of assets. Some external factors can lead to this abnormal fluctuation, e.g., transformative technologies can lead to some assets being obsolete. The pandemic significantly changed many supply-chain ecosystems, leading to abnormal asset fluctuation. Some internal factors, e.g., operational difficulty or earnings management, can also lead to this abnormal asset fluctuation.

These internal factors, operational difficulty, or earnings management can capture and signify the company's inherent risk and sustainability.

It is ultimately an empirical question as to whether and how measures of asset volatility derived from financial statement data can predict companies' sustainability. This empirical observation does not explain the detailed earnings manipulation schema but the indicator-oriented signal to push companies to provide extra disclosure for their abnormal fluctuation. By doing so, we can improve information quality.

Based on the discussions above, two hypotheses can be developed:

H1: When management uses the fluctuation of assets to smooth earnings, asset fluctuation has a negative relationship with the fluctuation of earnings.

H2: An abnormal long-term asset fluctuation is highly related to the firms' sustainability.

3.2.   Define the volatility metrics.

The first stage is to define the assets and earnings volatility. Literature uses normalization to measure volatility (e.g., Correia et al., 2018). This study uses Six Sigma metrics from the manufacturing industry and quality management to measure fluctuation and volatility. More and more management have called back Six Sigma measurements to improve business performance in the past decades. As Anil et al. (2004) demonstrated, "[the] integration of Six Sigma techniques brings in the rigor, thoroughness, and visibility to program management and thus provide a competitive edge resulting in an improved business outcome, resulting cost/cycle time reduction and increase in customer satisfaction."

The volatility metrics are defined based on the balance change between two consecutive quarterly balances. The study defines the change of accounting item as Equation 1:

$$AccountingItemChange_{i,t} = \frac{(AccountingItem_{i,t} - AccountingItem_{i,t-1})}{AccountingItem_{i,t-1}}$$

$Notes: i\ means\ a\ specific\ company, and\ t\ means\ a\ specific\ quater$

$- Equation\ 1$

This study defines the volatility of the balance change with an absolute Z-score. As discussed in Section 2. Some earnings management schema just moves revenue ahead and delays expenses later, and it will be adjusted back in the following years. Thus, the average volatility will weaken the fluctuation level over a long-term period. An absolute Z-score can solve this dilemma and highlight this volatility. The volatility metrics of a time series are defined in Equation 2 below.

$$Abs\_Z\_score\_TimeSeries\_AccountingItemChange_{i,t}$$
$$= \frac{|(AccountingItemChange_{i,t} - Means\ of\ the\ time\ series)|}{Standard\ Deviation\ of\ the\ time\ series}$$

$$Notes: i\ means\ a\ specific\ company, and\ t\ means\ a\ specific\ quater$$

- Equation 2

This paper uses the first two digits of the Standard Industrial Classification (SIC) to identify the major industry group. The study uses the same approach to define absolute Z-score accounting item change across the industry in Equation 3 below:

$$Abs\_Z\_score\_Industry\_AccountingItemChange_{i,t}$$
$$= \frac{|(AccountingItemChange_{i,t} - Means\ of\ the\ industry)|}{Standard\ Deviation\ of\ the\ industry}$$

$$Notes: i\ means\ a\ specific\ company, and\ t\ means\ a\ specific\ quater$$

- Equation 3

3.3. Data Collection

Barton & Simko (2002) used Net Operating Assets to test whether a balance sheet accumulates the effects of previous accounting choices and whether the level of net assets partly reflects the extent of previous earnings management (DeFond, 2002; Abernathy et al., 2014). My paper breaks down Net Operating Assets into specific asset items and selects Current Asset, Other Asset, Total Asset, Property Plant & Equipment (PP&E hereafter), Working Capital as the assets balance observations. The author also selects EPS Including Extraordinary Items, EPS from Operations, and Revenue as earning items to observe how their fluctuation can impact firms' delisting.

The study extracted the data sample from COMPUSTAT from 2006 through 2021. The original dataset includes 318,782 firm quarters. The author keeps the firms with more than 12 quarters to ensure the time-series data can be statistically meaningful. After this cleansing, the final dataset includes 6,218 firm years (24,800 firm quarters). Using the equations mentioned above, the study computes the volatility metrics (absolute Z-score) for each quarter during these 16 years (an auditing software, IDEA, was used for this computation because of its powerful function for data engineering). The annual average was calculated as the data input for the following analysis. The study also includes the maximum value of the four quarters as another metric to illustrate the abnormal fluctuation of the balance changes. The maximum metrics capture earning management behavior by writing off an abnormal amount of assets in one quarter (usually the fourth quarter) (Francis et al., 1996). Delisted companies are defined as listed companies from 2006 and

were delisted from 2007 through 2019. This is a binomial variable, and "1" is a delisted company. "0" is normal. The study first compared the COMPUSTAT data from 2006 and 2019 to extract the firms in 2006 but not 2019. Then the author confirmed these are delisted companies by searching Yahoo Finance data. These companies were private or merged with others, or the price was under one dollar in 2019. The author keeps two types of metrics, including time-series scaled and industry-scaled, in the research. The description of the annual average volatility metrics and the statistics are illustrated in Table 1.1.

Table 1. Data Attributes and the Statistics Description (observations: 6218)

Variable	Description	Average	Std. Dev.	Variable	Description	Average	Std. Dev.
X1	Annual average of the quarterly Current Assets volatility metrics (scaled by time series).	0.68	0.43	X17	Annual maximum of the quarterly Current Assets volatility metrics (scaled by time series).	1.28	0.94
X2	Annual average of the quarterly Other Assets volatility metrics (scaled by time series).	0.51	0.49	X18	Annual maximum of the quarterly Other Assets volatility metrics (scaled by time series).	1.1	1.35
X3	Annual average of the quarterly Total Assets volatility metrics (scaled by time series).	0.58	0.45	X19	Annual maximum of the quarterly Total Assets volatility metrics (scaled by time series).	1.14	1.09
X4	Annual average of the quarterly Working Capital volatility metrics (scaled by time series).	0.49	0.52	X20	Annual maximum of the quarterly Working Capital volatility metrics (scaled by time series).	1.17	1.16
X5	Annual average of the quarterly PP&E volatility metrics (scaled by time series).	0.95	1.64	X21	Annual maximum of the quarterly PP&E volatility metrics (scaled by time series).	1.65	3.53
X6	Annual average of the quarterly EPS of Operations volatility metrics (scaled by time series).	4.4	34.32	X22	Annual maximum of the quarterly EPS of Operations volatility metrics (scaled by time series).	9.14	56.28
X7	Annual average of the quarterly EPS Including Extraordinary Items volatility metrics (scaled by time series).	0.53	0.49	X23	Annual maximum of the quarterly EPS Including Extraordinary Items volatility metrics (scaled by time series).	1.14	1.3
X8	Annual average of the quarterly Revenue volatility metrics (scaled by time series).	0.87	4.12	X24	Annual maximum of the quarterly Revenue volatility metrics (scaled by time series).	1.58	4.33
X9	Annual average of the quarterly Current Assets volatility metrics (scaled by the first two digits SIC group).	0.53	0.5	X25	Annual maximum of the quarterly Current Assets volatility metrics (scaled by the first two digits SIC group).	0.99	0.98

X10	Annual average of the quarterly Other Assets volatility metrics (scaled by the first two digits SIC group).	0.4	0.51	X26	Annual maximum of the quarterly Other Assets volatility metrics (scaled by the first two digits SIC group).	0.85	1.29
X11	Annual average of the quarterly Total Assets volatility metrics (scaled by the first two digits SIC group).	0.48	0.5	X27	Annual maximum of the quarterly Total Assets volatility metrics (scaled by the first two digits SIC group).	0.94	1.07
X12	Annual average of the quarterly Working Capital volatility metrics (scaled by the first two digits SIC group).	0.43	0.58	X28	Annual maximum of the quarterly Working Capital volatility metrics (scaled by the first two digits SIC group).	0.85	1.22
X13	Annual average of the quarterly PP&E volatility metrics (scaled by the first two digits SIC group).	0.59	0.4	X29	Annual maximum of the quarterly PP&E volatility metrics (scaled by the first two digits SIC group).	1.14	0.83
X14	Annual average of the quarterly EPS of Operations volatility metrics (scaled by the first two digits SIC group).	0.48	0.49	X30	Annual maximum of the quarterly EPS of Operations volatility metrics (scaled by the first two digits SIC group).	1.00	1.26
X15	Annual average of the quarterly EPS including Extra Items volatility metrics (scaled by the first two digits SIC group).	0.83	3.57	X31	Annual maximum of the quarterly EPS including Extra Items volatility metrics (scaled by the first two digits SIC group).	2.36	14.16
X16	Annual average of the quarterly Revenue volatility metrics (scaled by the first two digits SIC group).	0.53	0.52	X32	Annual maximum of the quarterly Revenue volatility metrics (scaled by the first two digits SIC group).	0.97	1.02
Delist	This is a binomial variable, and "1" means delisted. "0" means normal. Delisted companies are defined as the companies listed from 2006 through 2008 and were delisted from 2009 through 2018.	0.2	0.4				

4.   Analysis Results

The analysis results of the two studies are reported in this section. The first part reports the results of the two groups of regressions. The second part reports the results of the Principle Component Analysis and the PCA logistic regression.

4.1.   A Test for the Relationship Between Earning Volatility and Assets Volatility

The question from Hypothesis 1 aims to test whether management uses the fluctuation of assets to smooth earnings. The study assumes that asset fluctuation has a negative relationship with earnings fluctuation. Assets are the economic resources that act as costs awaiting assignment to future revenues (Paton & Littleton, 1994). Assets will sooner or later become expenses to match revenues and lead to future benefits. When the revenues face volatile fluctuation, management has the discretion to fluctuate the asset side (reflected in the expense side) to smooth earnings. The abnormal fluctuation in assets balance will be reversed in the following years (Barton & Simko, 2002; DeFond, 2002; Abernathy et al., 2014; Beneish, 1999; Correia et al., 2018). It is challenging, if not impossible, to detect some strategic earnings management because accounting is based on many assumptions and estimates. To achieve this goal, managers may aggregate various transactions via various accounts, like inventory, leased assets, and accounts receivable. Some of them are real business transactions, and some of them take advantage of accruals. However, these behaviors unavoidably will be reflected in the fluctuation level of asset balances. An abnormal asset fluctuation signals inherent risk (huge fluctuation of revenues) or control risk (lack of internal controls to assure earnings quality).

This test sets two groups of regressions to observe how the assets' volatilities impact earnings volatilities. Each group has three regressions.

4.1.1. The Analysis Result of the First Regression Group

The first group includes three dependent variables: EPS of Operation Average (X14), EPS including Extra Items Average (X15), and Revenue Average (X16). The independent variables have the asset volatility metrics items, including the average and maximum volatility metrics. The result is illustrated in Table 2 below.

The results show that working capital volatility metrics have a significant positive relationship with three earning volatility metrics. The fluctuation of earnings metrics moves in the same direction. However, in Regression 3, the working capital volatility maximum metric shows a significant negative relationship with Revenue metrics. This negative relation demonstrates that firms have the potential to fluctuate working capital to

smooth earnings when revenue faces a challenging fluctuation. The EPS of Operation (Regression 1) regression shows a positive relationship with the maximum volatility metrics of PP&E but a negative relationship with the average volatility metrics of PP&E. This finding demonstrates that a highly volatile PP&E change can smooth the change of the EPS of Operation. The highly fluctuated EPS of Operation is responded to by a highly fluctuated PP&E in one quarter (usually the fourth quarter) of the studying year. Francis et al. (1996) and Beneish (1999) had equivalent results: firms manage earnings by writing off assets or restructuring charges but not with inventory write-offs. Regression 2 shows a positive relationship between EPS including Extra Items and the average volatility metrics of Other Assets and Working Capital. This result makes sense that highly fluctuated EPS Including Extra Items usually follows fluctuated Other Assets and Working Capitals; no evidence regarding earnings smoothing can be found in this regression.

Table 2. The Regression Result of Earnings and Assets Volatility (Average Metrics)

Dependent Variable	Regression 1 X6 (EPS of Operation Average)		Regression 2 X7 (EPS including Extra Items Average)		Regression 3 X8 (Revenue Average)	
R-squared	0.01		0.02		0.005	
Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Current Asset Average (X1)	2.37	1.96*	(0.02)	(0.37)	0.29	0.97
Other Asset Average (X2)	(2.67)	(1.9)	0.12	2.61**	(0.32)	(2.7)**
Total Asset Average (X3)	(1.51)	(0.85)	0.07	1.22	(0.44)	(1.55)
Working Capital Average (X4)	2.62	4.46***	0.05	2.11*	0.59	12***
PP&E Average (X5)	(1.5)	(4.59)***	0.003	0.24	(0.06)	(1.31)
Current Asset Max (X17)	0.26	0.38	0.009	0.47	0.05	0.38
Other Asset Max (X18)	1.81	3.1***	(0.02)	(1.47)	0.1	1.82
Total Asset Max (X19)	(1.48)	(2.08)*	0.005	0.25	0.17	1.27
Working Capital Max (X20)	(0.29)	(0.66)	0.0004	0.04	(0.29)	(3.51)***
PPE Max (X21)	0.59	3.82***	0.0009	0.16	0.03	1.44
Constant	3.48	8.08***	0.42	29.06***	0.8	7.81***

4.1.2. The Analysis Result of the Second Regression Group

The second group of regression includes dependent variables of the EPS of Operation Maximum (X22), EPS including Extra Items Maximum (X23), and Revenue Maximum (X24). The independent variables stay the same as the study did in the first group of regressions. The result is illustrated in Table 3 below.

Two findings are highlighted in this test. First, the maximum volatility of these earnings items has a positive relationship with the average volatility of PP&E but a negative with the maximum volatility of PP&E. This finding concurs with the findings in the first test. The result means highly fluctuated PP&E balances often relate to a smooth EPS performance. When the earnings have abnormally high volatility in any quarter, PP&E will also have a high responding fluctuation. Second, regression 3 shows a significant negative relationship between the maximum volatility metrics of revenue and the average volatility of other assets, total assets, working capital, and PPEs. When firms face abnormally fluctuating revenues for any reason, firms are highly likely to fluctuate asset balances to fluctuate expenses and smooth earnings (could be reflected as EPS or other earnings items). Furthermore, the relationship is negative between the maximum volatility metrics of revenue and the maximum volatility of total assets. This relationship shows that a highly fluctuated revenue usually will be responded to by a highly fluctuated total assets in one quarter of the studying year.

Table 3. The Regression Result of Earnings and Assets Volatility (Maximum metrics)

Dependent Variable	Regression 4		Regression 5		Regression 6	
	X22 (EPS of Operation Maximum)		X23 (EPS including Extra Items Maximum)		X24 (Revenue Maximum)	
R-squared	0.01		0.01		0.007	
Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Current Asset Average (X1)	5.98	1.9	(0.15)	(1.6)	0.52	1.71
Other Asset Average (X2)	(6.33)	(1.7)	0.06	0.74	(0.32)	(2.62)**
Total Asset Average (X3)	(5.62)	(1.16)	0.02	0.22	(0.58)	(1.97)*
Working Capital Average (X4)	5.85	3.91***	0.02	0.38	(0.25)	(3.76)***
PPE Average (X5)	(3.94)	(4.56)***	(0.14)	(4.79)***	(0.2)	(3.47)***
Current Asset Max (X17)	0.98	0.55	0.09	1.95*	0.02	0.16
Other Asset Max (X18)	4.81	3**	0.04	1.15	0.11	1.95
Total Asset Max (X19)	(3.80)	(1.98)*	0.09	1.96*	0.27	2*

Working Capital Max (X20)	(0.33)	(0.28)	0.32	1.35	0.1	1.16
PP&E Max (X21)	1.56	3.85***	0.06	4.38***	0.1	3.82***
Constant	8.08	7.2***	0.93	28.27***	1.29	11.65***

The analysis result can support Hypothesis 1. Management uses the fluctuation of assets to smooth earnings. When a firm faces a volatile revenue fluctuation because of any reasons, like severe competition or a dawn-warding economic environment, managers have extremely limited discretions to manage the revenue side, so they can manage the expense side and fluctuate the balance of assets.

4.2. A PCA Logistic Regression to Study How the Interaction of Assets and Earnings Volatility Impact Companies' Delisting

In this section, the author wants to observe how abnormal assets and earnings fluctuation and the interaction can cause firms to have sustainability issues. The study uses firms' delisting as a proxy to observe how the volatility metrics can impact firms' sustainability.

4.2.1. Develop the Conceptual Factors with Principal Component Analysis

This study follows Han et al. (2008) to use a PCA logistic regression to observe how the volatility of these asset items and the interaction of these fluctuations can impact companies' delisting. In this approach, we must first conduct the PCA analysis on the financial account items and then select certain factor variables according to contribution rates to develop a few virtual components with the least information loss. The generated virtual components are not from the original variables directly but are some new factors through new synthesis that can affect the original variables. These generated components are independent statistically, so we can effectively overcome multiple co-linearity among original variables without losing too much information.

Using STATA software, the study runs a PCA analysis of the 32 financial accounting items and obtains initial Eigenvalues and extraction sums of squared loadings (Table 4). The study uses one as the threshold of the eigenvalue. Twelve virtual factors are chosen to test how these factors impact companies delisting. Table 4 shows that the contribution rate of the first twelve eigenvalues is 87%. The information loss from the original variables is limited to within a controlled range.

Table 4. Total Variances Explained

Rank	Initial Eigenvalues	% of Variance	Cumulative Variance
1	7.06	0.22	0.22
2	2.82	0.09	0.31
3	2.55	0.08	0.39
4	2.34	0.07	0.46
5	2.02	0.06	0.53
6	1.99	0.06	0.59
7	1.96	0.06	0.65
8	1.75	0.05	0.70
9	1.52	0.05	0.75
10	1.34	0.04	0.79
11	1.26	0.04	0.83
12	1.12	0.03	0.87

The author chose a correlation loading significance of 0.25 or above as the threshold for these selected eigenvectors. The component metrics are reported in Table 5. Based on these metrics, the study generates the following twelve conceptual components. The study tests Cronbach's Alpha for these 12 variables; the result is 0.7019, which shows acceptable reliability for these virtual concepts (e.g., Jaracz et al., 2006).

Table 5. The Component Metrics

	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10	Factor11	Factor12
X1									(0.28)			
X2				(0.25)								
X4				0.28								
X5					0.26	0.55						
X6					(0.27)			0.51				
X7			0.35					(0.34)				0.4
X8						0.32	0.56					
X9	0.27			(0.28)							(0.28)	
X10									0.3			
X11	0.3										(0.26)	
X12				0.36					0.36			
X13										0.54		
X14		0.39										(0.5)
X15					0.53		0.34					
X16		0.3									0.48	
X17	0.25								(0.26)			
X18				(0.25)								
X19	0.25											
X20				0.33							0.26	
X21					0.25	0.54						
X22					(0.27)			0.5				
X23			0.38					(0.34)				0.37
X24						0.31	0.56					
X25	0.28										(0.26)	
X26				(0.29)					0.3			
X27	0.3											
X28				0.38					0.34			
X29										0.58		
X30		0.37	0.25									(0.49)
X31					0.53		0.35					
X32		0.29							(0.26)		0.5	

4.2.2. The Result of The Principal Component Analysis

The study defines the first factor as Asset Volatility. The control variables include time-series-scaled Current Asset maximum and Total Asset maximum, Industry-group-scaled Current Asset average and maximum, and Total Asset average and maximum. This factor is expected to affect firms' desilting risk positively. Abnormal asset fluctuation can be a risk signal and lead to companies delisting. This factor can be expressed as:

$$Asset\ Volatility\ (Factor1)$$
$$= 0.25 * X17 + 0.25 * X19 + 0.28 * X25 + 0.3 * X27 + 0.27 * X9 + 0.3 * X11$$

The study defines the second factor as industry-scaled earnings volatility. The control variables include industry-scaled Revenue (average and maximum) and EPS of Operation (average and maximum). This factor means highly unstable business revenues and is expected to positively affect firms' delisting risk. This factor captures the uncertain operating challenges reflected as a high Z-score of Revenues and EPS of Operation. However, this volatility may not be accounting-generated fluctuation for two reasons. First, GAAP offers extremely limited discretion in managing sales or revenues, so most earnings management (not fraud) schema is unrelated to revenues. Second, the earnings smooth schema mainly takes the time-series perspective, and few information users care about how the firms' earnings fluctuation differs from the industry peers. The second factor can be expressed as:

$$Industry\ Scaled\ Earnings\ Volatility\ (Factor2)$$
$$= 0.37 * X30 + 0.29 * X32 + 0.39 * X14 + 0.3 * X16$$

The third factor can be defined as EPS volatility. The control variables include time-series scaled EPS Including Extra Items (average and maximum), and industry-scaled EPS of Operation maximum. This factor is expected to negatively affect delisting risk, which means exceptionally smooth EPS including extra items may be accounting-generated and earnings manipulation-related. There are many accounting discretions in the computation of EPS including extra items. The third factor can be expressed as:

$$EPS\ Volatility\ (Factor3) = 0.35 * X35 + 0.38 * X23 + 0.25 * X30$$

The fourth factor is defined as Working Capital Corresponding to Other Assets. It has four control variables regarding working capital and four other assets. Both cover average and maximum in the time-series group and industry-scaled group. The working capital group has a negative relationship with the other assets group. The factor can be expressed as:

$$Working\ Capital\ Corresponding\ to\ Other\ Assets\ (Factor5)$$
$$= 0.33 * X20 - 0.25 * X2 - 0.25 * X18 - 0.29 * X26\ + 0.38 * X28$$
$$+ 0.28 * X4 - 0.28 * X9 + 0.36 * X12$$

The fifth factor is defined as PP&E Corresponding to EPS. It has two time-series scaled PP&E metrics and two EPS of Operation metrics (average and maximum). The PP&E metrics have a negative relationship with EPS metrics. This negative relationship can be interpreted as evidence that PP&E volatility can smooth the EPS fluctuation, so this component is a primary variable in the following PCA logistic regression. The other two control variables are industry-scaled metrics of EPS including Extra Items. This factor is expected to negatively affect firms' delisting risk because the negative relationship may cancel abnormal fluctuations. We need to check the interaction impact of this factor and other earnings-related factors. The factor can be expressed as:

$$PP\&E\ Corresponding\ to\ EPS\ (Factor5)$$
$$= 0.26 * X5 - 0.27 * X6\ + 0.25 * X21 - 0.27 * X22 + 0.53 * X31 + 0.53$$
$$* X15$$

The sixth factor is defined as PP&E Corresponding to Revenue. It has two time-series scaled PP&E metrics and two Revenue metrics, including average and maximum. The PP&E metrics have a positive relationship with Revenue metrics. This positive relationship concurred with the regression result in the prior section. It is interpreted as evidence that PP&E volatility can smooth earnings when firms face significant revenue fluctuation. Another phenomenon should happen for highly growing companies with fast revenue and PP&E growth. This factor is a primary variable in the following PCA logistic regression, and it is expected to impact firms' delisting risk negatively. The factor can be expressed as:

$$PP\&E\ Corresponding\ to\ Revenue\ (Factor6)$$
$$= 0.55 * X5 + 0.54 * X21 + 0.31 * X24 + 0.32 * X8$$

The seventh factor is the Interaction of Revenue, Working Capital, and EPS Including Extra Items. It has time-series scaled Revenue Maximum metrics, and three industry-scaled metrics (average and maximum EPS including extra; Working Capital maximum). The PP&E metrics have a positive relationship with Revenue metrics. This interaction shows supplemental evidence that firms could use abnormal fluctuation of working capital to inject smooth earnings in EPS Including Extra Items when firms face significant revenue fluctuation. This factor is a primary variable in the following PCA logistic regression and is expected to affect firms' delisting risk negatively. The factor can be expressed as:

$Interaction\ of\ Revenue\ Working\ Capital\ \&EPS\ Extra\ (Factor7)$
$$= \ 0.56 * X24 + 0.35 * X31 + 0.56 * X8 + 0.34 * X15$$

The eighth factor can be defined as Time Series EPS volatility. The control variables include time-series scaled EPS of Operation and EPS Including Extra Items (average and maximum). This component can be expressed as:

$Time\ Series\ EPS\ (Factor8)$
$$= 0.51 * X6 - 0.34 * X7 + 0.5 * X22 - 0.34 * X23$$

The ninth factor is the first interaction of industry scaled Revenue and multiple Assets (a similar interaction is followed in the eleventh component). It has industry-scaled Revenue Maximum metrics and six asset volatility metrics (including Current assets, Other assets, and Working Capital). The Revenue metrics have a positive relationship with Other Asset and Working Capital metrics, but a negative relationship with Current Asset metrics. This interaction shows supplemental evidence that firms could use an abnormal asset fluctuation to smooth earnings when firms face significant revenue fluctuation. This component is another primary variable in the following PCA logistic regression and is expected to negatively affect firms' delisting risk. The component can be expressed as:

$First\ Interaction\ of\ Revenue\ \&Multiple\ Assets\ (Factor9)$
$$= 0.3 * X26 - 0.28 * X1 - 0.26 * X17 - 0.26 * X32 + 0.34 * X28 + 0.3$$
$$* X10 + 0.36 * X12$$

The tenth factor can be defined as industry-scaled PP&E volatility. The control variables include industry-scaled PP&E volatility (average and maximum). This factor is expected to affect firms' delisting risk positively; the higher PP&E volatility means a higher risk. The tenth component is expressed as:

$Industry\_scaled\ PP\&E\ Volatility\ (Factor10)$
$$= 0.58 * X29 + 0.54 * X13$$

The eleventh factor is the second interaction of industry-scaled revenue and multiple assets. It has industry-scaled Revenue maximum and average metrics and four asset volatility metrics (including Current assets, Total Assets, and Working Capital). The revenue metrics have a positive relationship with Working Capital maximum metrics, but a negative relationship with current asset and total asset metrics. This interaction shows supplemental evidence that firms could use an abnormal asset fluctuation to smooth earnings when firms face significant revenue fluctuation. This factor is another primary variable in the following PCA logistic regression and is

expected to negatively affect firms' delisting risk. The component can be expressed as:

$Second\ Interaction\ of\ Revenue\ \&Multiple\ Assets\ (Factor11)$
$$= 0.26 * X20 - 0.26 * X25 + 0.5 * X32 - 0.28 * X9 - 0.26 * X11 + 0.48 * X16$$

The twelfth factor can be defined as EPS interaction volatility. It is similar to the third component that includes time-series scaled EPS Including Extra Items (average and maximum), and industry-scaled EPS of Operation maximum. However, the difference is that this component adds industry-scaled EPS of Operation average as the fourth control variable and shows a negative relationship between these two groups. This interaction demonstrates the potential that firms could structure a fluctuation of EPS Including Extra Items to smooth EPS of Operations. Literature shows evidence that EPS including Extra Items has more accounting discretions to deal with and it is easy for management to take advantage of it (Dechow & Schrand, 2004; Roychowdhury, 2006). The twelfth component can be expressed as:

$EPS\ Interaction\ Volatility\ (Factor12)$
$$= 0.4 * X7 + 0.37 * X23 - 0.49 * X30 - 0.5 * X14$$

In the next stage, we can put these concepts into the PCA logistic regression to observe how these volatility metrics can impact the delisting.

4.2.3. The Result of the PCA Logistic Regression
The author runs a PCA logistic regression to observe how abnormal fluctuation impacts companies' sustainability. The study takes the mixed effect logistic regression on the panel data with the 12 latent variables. The study also controls the interaction of factors 5 and 8 and the interaction of factors 5 and 12. The result is reported in Table 6 below.

Table 6. The Report of the PCA Logistic Regression
Dependent Variable: Delist

Variable	Coefficient	Standard Error	Statistics (P-value)	95% CI
Factor 1	(0.02)	0.03	(0.61)	(0.09) - 0.045
Factor 2	0.4	0.06	6.7***	0.28 - 0.51
Factor 3	(0.16)	0.05	(3.04)***	(0.27) – (0.06)
Factor 4	(0.004)	0.01	(0.41)	(0.07) - 0.04
Factor 5	(0.006)	0.008	(0.74)	(0.02) – 0.01
Factor 6	(0.03)	0.01	(2.57)**	(0.05)- (0.006)
Factor 7	(0.001)	0.01	(0.12)	(0.02) – 0.02
Factor 8	(0.19)	0.02	(0.8)	(0.07) -0.03
Factor 9	0.13	0.04	(3.18)***	0.05-0.2
Factor 10	0.04	0.05	0.08	(0.06) – 0.14
Factor 11	(0.14)	0.05	(2.57)**	(0.25) – (0.03)

Factor 12	(0.02)	0.03	(0.68)	(0.09) -0.04
Factor 5* Factor 8	(0.0004)	0.0001	(2.33)**	(0.007)- (0.001)
Factor 5* Factor 12	(0.005)	0.0002	(2.29)**	(0.0009)-(0.0001)
Factor 7* Factor 8	(0.003)	0.0009	(3.1)***	(0.005)- (0.001)
Constant	(1.55)	0.06	(27.11)***	(1.68) – (1.39)

4.3.   A Discussion of the Analytics Result

According to the results in Table 6, Factor 2 significantly affects firms' desilting risks as expected. This positive relationship means that highly fluctuating business revenue causes operating risk. In other words, this risk comes from genuine business operations and competition. The risk caused by this factor is not from earnings management activities. Factor 3 negatively affects delisting risk, which means very smooth EPS including extra items may be accounting-generated related to high-level earnings manipulation. There are many accounting discretions in the computation of EPS Including Extra Items. Unfortunately, a significant relationship between Factor 5 and delisting risk cannot be found. However, the interaction of Factors 5 and 8 and Factors 5 and 12 significantly impact the delisting risk. This finding concurs with that of Francis et al. (1996) and Beneish (1999). They found that firms manage earnings by writing off long-term assets or restructuring charges but not with inventory write-offs. These writing-offs often happened in the fourth quarter.

In addition, Factor 6 impacts delisting negatively, and this means that one situation needs be excluded as a risky sign. The interpretation for this negative relation is that highly growing companies could have concurrently fast revenue and PP&E growth. The highly volatile PPEs in high-growth companies are normal. Lastly, the two interactions between revenue and multiple assets (Factors 9 and 11) illustrate an earnings management behavior. When firms face business challenges and suffer an abnormal fluctuation in revenues, they have the motivation and discretion to fluctuate their assets balances and smooth earnings to reveal a financial sustainability risk.

However, Factor 1 does not show a significant relationship in the regression. This result is unexpected, and we may explore the potential reasons in future studies. The potential interpretation is that there are two types of asset volatility, including real assets volatility and accounting-generated assets volatility. Most of the real assets' volatility is not a signal of risk. This interpretation is also related to Factor 4. Working capital is highly liquidated, and the fluctuation is complicated when it corresponds to other assets. We cannot derive potential earning management schema from these current assets' fluctuation.

Based on the discussions above, Hypothesis 2 is highly supported. An abnormal long-term asset fluctuation is highly related to the firms' sustainability.

Conclusion

Assets will become expenses to match revenues and recognize earnings sooner or later. The speed of this transformation really matters because many earnings management schemas may be derived from how fast assets can become expenses. This paper uses the Six Sigma metrics to trace earnings manipulation over a lengthy period. The findings show that the abnormal fluctuation of long-term assets signals the risk that companies use accounting-generated schema to manipulate earnings. Mostly this manipulation is strategic and hard to detect. The PCA regression analysis breaks down the nature of these aggressive earning management behaviors (sometimes bad even fraud activities). This breakdown works because manipulated earnings must be reversed in future years. The manipulation will be reflected in the signals of abnormal fluctuation of asset change no matter the manipulation approaches. Fixed Assets' abnormal fluctuation is considered a clear indicator of risk.

From the policy-making perspective, abnormal fluctuation of assets needs to be alerted, and management is responsible for disclosing the back story of these fluctuations. As the Statement of Financial Accounting Standards (SFAS) 151 requires direct disclosure of abnormal excess capacity costs, companies have an obligation to disclose abnormal asset volatility. This disclosure can force management away from using long-term assets to manage earnings.

The limitation of this study is that it does not compare how the proposed approach can be more effective to detect aggressive earnings management than approaches in the extant literature. Moreover, because of the constrained space, this paper did not have detailed study about whether auditing could discover the earnings management behavior detected by the abnormal asset volatility. Furthermore, the study did not demonstrate how this highly volatile assets' balance was related to corporate governance feature. These topics can uncover important insights for earnings management. In future research, this study can be extended to observe whether the abnormal fluctuation is related to share-based compensations and corporate governance features. It is also valuable to explore whether auditing can identify the information contents from the volatility of the abnormal asset in annual auditing. Furthermore, the abnormal asset fluctuation also could be related to share price behavior and third-party stock trading behavior.

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Data Availability: All of the data are included in the content of the paper.

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Do People Perceive Products Differently when Buying for Self Versus for Others? Malleable Brand Personality in Gifting

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Abstract
According to social identity theory, people behave differently in a social context than when they are by themselves because of social identity salience. Like people, brand personality changes depending on situations and context. There is lack of research investigating identity salience within the context of gifting and its subsequent impact on the perceived brand personality of a gift in different gifting situations. This paper proposes that in gifting situations of others, a social identity is activated which leads to change in the perceived brand personality of the same product purchased for self-gifting. Within the Japanese context, the hypothesis states that the excitement of brand personality dimension is more prominent in self-gifting than in gifting others, while competence and sincerity brand personalities are more prominent in gifting others than in self-gifting scenarios. To test these hypotheses, thirty-six brand personality traits (Aaker et al., 2001) of eight brands were evaluated by 251 respondents in Japan. Factor analysis and multiple regression results support the main hypotheses. The paper concludes with managerial implications and future research directions.

Introduction

The recent 'one for you, one for me' marketing campaigns that promote simultaneous self-gifting and gifting others motivated this research to investigate the complexity of simultaneous gifting of self and others. While earlier research reported that gifting others is mostly a positive emotional experience for both the gift-givers and the receivers (Sherry, 1983), recent research showed that buying gifts for others could be a negative emotional experience for the gift-giver. This is because their own self-identity is threatened in the process of choosing gifts for others (Ward & Broniarczyk, 2011). Furthermore, even if the intention of the gift-giver is to please the receiver of the gift, gift-givers do not choose gifts that maximize the recipient's happiness (Baskins et al., 2014). The current research knowledge of gifting self and others is yet to address the difference in gift givers' emotional attachment to the same product or brand when they are simultaneously gifting (i.e., one for you, one for me) the same brand to themselves and to others. For example, a tourist who just finished her visit to Hokkaido, Japan purchases two boxes of the most famous Hokkaido-made Shiroi- Koibito (translated in English as "white lovers") chocolate at the airport – one for herself and one for her colleagues at work. However, is it possible that she perceives Shiroi-Koibito as an exciting brand for her own gift and a sincere brand for her colleagues? Furthermore, since brands have personalities that are interrelated to consumers' emotional attachment (Malar et al., 2011), including multi-dimensional personalities (Aaker, 1997), is it possible that the prominence of certain dimensions of brand personality may vary depending on self-gifting and gifting others?

The argument toward the variance of brand personalities of the same brand in the context of gifting self versus others is possible when merging the literature on two things: role identity salience and brand personality malleability. First, for role identity salience, it is proposed that a consumer plays two different roles in gifting self versus others. Identity salience is a temporary state in which a person's identity is activated (Forehand et al., 2002). Once the identity is activated, it impacts social behavior (Hogg et al., 1995) and judgment (Reed, 2004). While adapting identity salience in a gifting situation, this research proposes that when a consumer engages in purchasing gifts for others, their role as social self is activated. This leads to behavior that is subject to expectations from their group and social norms. Contrarily, when they purchase a gift for themselves, their social role identity is not invoked, and they behave as their unique individual self.

Second, it is proposed that the difference in perceived brand personalities can happen even within the same brand in two gifting scenarios. Past research mainly relies on implicit theory which explains the personality of self being malleable (Aaker, 1999). Subsequently, brand personalities

become malleable in the case of product extension of the same brand (Yorkston et al., 2010). Nevertheless, this paper argues that the situation of gifting others, compounded with role salience of social role when purchasing gift for others, is the reason why the perceived brand personality of the same brand becomes malleable and differs between gifting others and self-gifting.

The proposed difference in brand personalities in two gifting situations hinges on the emotions surrounding these activities and behavior difference surrounding the social self. More specifically, previous research has reported that self-gifting mostly elicits positive emotions of excitement and happiness (cf. Heath & Tynan, 2015). The emotions surrounding gifting others are a bit more complex and include negative feelings of "self" being threatened (Ward & Broniarczyk, 2001) or downplaying the maximization of happiness when compared to self-gift (Baskins et al., 2014). When role salience of people is activated in social context, they behave in ways that are consistent with what is expected of them (Hogg & Abrams, 1993). Based on this prior literature, this paper hypothesizes that the excitement of a brand's personality is stronger (weaker) in self-gifting (gifting others) situation. Conversely, in gifting others (self-gifting), socially expected brand personality (e.g., sincerity, competence) is stronger (weaker). To test these hypotheses, we collected data from 251 respondents and their evaluation of the brand personalities of eight popular brands.

The rest of the paper begins with a literature review of role identity salience, gifting self and others, and brand personality malleability. This is followed by a new conceptual framework with hypotheses. Results from factor analysis and regressions support most of the hypotheses. The final section of the paper concludes with managerial implications and limitations.

Literature Review
Social Role and Role Identity Salience

Role theory posits that a person plays multiple social roles (e.g., being a professor, a mother attending a PTA meeting, an activist in an NGO) and creates multiple identities (Burke, 1980). Role identities are mental representations (Reed, 2004) that people conceptualize and apply to themselves in response to the structural role positions they occupy. People often invoke their various identities to fit themselves in and maximize meaning in a specific social context (Hogg et al., 1995). In so doing, they self-categorize and define themselves as a member of a particular social category (Burke 1980). Self-categorization allows one to engage in whatever categorization that is cognitively and readily available. It is a mechanism that best explains or fits the similarities and differences among people (Hogg et al., 1995). People usually behave in ways that are consistent with their role identities because of reducing incongruency between their own internalized

identity standards and how others perceive them (Hogg et al., 1995). For example, a non-Japanese in a group of Japanese people will try to avoid the negative implications of self-categorization.

An individual has many role identities that are essentially multiple components of self (Brewer, 1991). At the core of these many identities or social identities resides personal identity (Brewer, 1991). The identity a person chooses to use in a social context depends on identity salience. Identity salience is defined as the likelihood that an identity will be invoked in diverse situations (Stryker, 2007). These multiple role identities are organized hierarchically and the ones positioned at the top of the hierarchy are more likely to be invoked in a particular situation than the identities at the bottom of the hierarchy (Stryker, 2007). When an identity is activated, it impacts social behavior (Hogg et al., 1995) and judgment (Reed, 2004). Essentially, identity salience is tied to the probability that forms the basis for action. Therefore, the higher the position a role identifies, the more likely it is being invoked in a particular situation, thus leading closely to behavior.

Social Context and Personality

It must be noted that in their social roles, people do not lose their own self or self-identity *per se*. This means that they choose to change from their own unique individual identity to group identity (Brewer, 1991). The mechanism of this change is based on the depersonalization of self in a social group by way of a contextual change in the level of identity. This allows a unique individual to become a group member that chooses the prototype of group attributes (Brewer, 1991). The reason behind the selection choice of group attributes over unique individual attributes rests in the fundamental needs for people to see themselves in a positive light, alongside other relevant individuals in their in-group. As a result, they behave in ways that are consistent with their role (or social) identities (Hogg & Abrams, 1993). Recent research reported that personal identity and collective identity work differently when it comes to consumers' purchasing decision on a foreign product (Irini et al., 2015). More specifically, these authors reported that collective identity positively impacted attitude, preference, liking, and intention to purchase. Thus, the personal identity had no impact at all. They concluded that purchasing a foreign product was collectively influenced but not personally influenced. The coexistence of personal and collective identities and the variance in the salience of these identities are evident among emigrants from Latvia (Mierina & Koreleva, 2015) and Kazakhstan (Bokayev, 2013). Mierina and Koreleva (2015) found that Latvian emigrants living in other European countries hold personal identity and collective or social identity, which is exhibited in the form of national identity and supra-national identity,

respectively. Therefore, the strong sense of identity toward host country was contextual depending on when they emigrated (e.g., during crisis).

When it comes to the relationship between social context and personality, there are two camps about personality (Dweck et al., 1995). First, the entity theorists believe that personality once formed is stable and cannot be changed. The second camp of incremental theorists posits that personality is malleable and can be changed depending on situations. In addition, social environment can change the personality. However, their philosophy on social constructivism was originally put forward by Lev Vygotsky and others (Khmil & Popovych, 2019). According to the social constructivists, people are subject to and able to fluidly calibrate their personality with social expectation or allow the social context to influence their individual personality (Khmil & Popovych, 2019). The mechanism of this lies in an interaction effect of the collective personalities of groups members and the expression of the group personality in the individual (Webster & Ward, 2011). In other words, one's personality varies depending on social context. This forms the foundation of brand personality malleability that will be discussed later.

Emotions – Motivational and Emotional Difference in Self-gifting versus Others

Self-gifting is defined as 'personal symbolic self-communication through special indulgences that tend to be premeditated and highly context-bound". It is categorized into two main motivations: reward and therapeutic motivations (Mick & DeMoss, 1992).Although self-gifting is premeditated, some reported that it can be impulsive (Atalay & Meloy, 2006). In contrast, the motivation for giving gifts to others ranges from altruistic to agnostic reasons (Sherry, 1983). These can be categorized in the following multiple dimensions: 1) obligation (i.e., guilt driven, expectation, reciprocity) to improve, maintain, or exchange social relationships (Belk, 1979), 2) utilitarian purposes for practicality or usefulness (Wolfinbarger & Yale, 1993), and 3) self-extension to fulfil a giver's positive experience when the giver exerts extensive effort to choose gifts for others. This is essentially giving a portion of 'self-identity' to the recipient in an objectified form of a gift (Belk, 1979; Sherry, 1983).

The emotions of self-gift are mostly associated with positive effect (cf. Heath & Tynan, 2015), while the emotions surrounding gifting others are more complex. Whether the motivation is about reward or therapeutic, people experience positive emotions such as joy, excitement, contentment, delight, and happiness when they buy gifts for themselves. These positive emotions supersede negative emotions such as remorse, guilt, and worry for purchasing inappropriate gifts for oneself (Heath & Tynan, 2015; Mick & DeMoss, 1992, Mick et al., 1992). From a mood regulatory argument, research findings are

mixed. This implies that intense bad mood makes self-gifting worse (Luomala & Laaksonen, 1999). Self-gift is more expressive than gifting others as the people gifting themselves are psychologically closer to oneself than to others (Baskins et al., 2014). Self-gifting is often an exciting and happy occasion. It is an impulsive action (Atalay & Meloy 2006). Impulsive action or purchase elicits excitement for brand personality (Sundar & Noseworthy, 2016).

Research in emotional display, which is not influenced by gift context, also explains the emotions of happiness in gifting situations of self and others. Researchers compared the expression of emotions in private and in public and found that when subjects triumphed in a competition with peers, they would conceal their spontaneous happiness from their peers (Friedman & Miller-Herringer, 1991). In other words, expressing emotions of happiness is more prominent at private-self environment than at public display. However, competition emotions are acceptable for public display.

The emotions surrounding gifting others include both positive and negative feelings. Earlier research reported the following positive emotions of a giver: a) feelings of excitement when the gifts surprises and delights the receivers (Belk, 1996) and b) the giver was pleased to have extended their own self-image or self-identity while choosing a gift (Sherry, 1983). In this stream of research, choosing gifts for others is confounded with the givers' own predisposition. However, it was believed to maximize pleasure for both the giver and the receiver (Sherry, 1983). Recent research reported that even when people are aware of the idea of choosing a gift to maximize the receiver's happiness, they often do not choose gifts that maximize happiness for others. This is contrary to self-gifting that allows maximum happiness for oneself (Baskins et al., 2014). When buying gifts for others, people choose features of gifts or brands that represent the desired social image of the givers (Gupta et al., 2023). For example, for a friend's birthday, instead of purchasing a coffee mug from a discount store, givers would choose one from Starbucks even if the giver does not go to Starbucks normally. Starbucks in this case represents a socially acceptable brand that fits in as a desirable social image. This concept is closely related to the literature of social role theory, social identity salience, and social context and personality mentioned above.

Malleable Brand Personality

Brand personality is defined as a basket of adjectives that describe the emotional and symbolic perceptions one has toward a certain brand, which is malleable (Yorkston et al., 2010). There are two main reasons for malleability of brand personality. The first reason is because consumers make inferences regarding the malleability of their own self and other people's personality traits (Aaker, 1999). Therefore, they project such inferences towards brands (Yorkston et al., 2010). Yorkston and colleagues (2010) found that in brand

extension, consumers accept a different set of brand personality, which differs from the brand personality of the original product.

Another reason for malleability of brand personality is situational, depending on the role a brand plays. Based on role theory, a brand plays different roles that change their brand personality and malleability, depending on their roles. Azoulay (2005) put forward a notion that consumers will find the personality of a brand different whether they are buying it as a product, buying the stocks of the company, or applying for a job in the company.

Different brand personality also emerges depending on purchase situation. Sundar and Noseworthy (2016) reported that during an inconsistent purchase (e.g., impulse purchase), excitement brand personality is prominent. On the other hand, a consistent purchase is associated with sincerity brand personality. Self-gifting is considered an impulsive purchase (Atalay & Meloy, 2006). Regarding the association between brand attribute and gifting, Baskins et al. (2014) found that self-gifting has less ambiguous brand attributes than gifting others. This is because the psychological distance to self-gifting is smaller than that of gifting others.

Gift Giving in Japan

Japan has a rich and ritualistic culture of gifting others. Other than the *de facto* universal life event-based gifts for birthdays, school entrance/graduation, Father's or Mother's Day, Valentine's Day, Halloween, coming-of-age, weddings, funerals, and Christmas, Japanese celebrates formal gift-giving occasions, such as midsummer gift (O-chugen in Japanese) and year-end gift (O-seibo in Japanese), and many informal gift-giving occasions (Lotz et al., 2003). Gift giving is an institutionalized cultural norm that is interwoven in the daily lives of Japanese people. In general, Japanese people view gift giving as an obligatory and reciprocal gesture to nurture and maintain positive social relationships (Witkowski & Yamamoto, 1991). Asian consumers are particularly impacted by situational influence in gifting (Lotz et al., 2003). At the same time, self-gifting has recently become an important ritual and research topic in Japan (Kanno & Suzuki, 2019). Self-gifting on 'singles' day' is a worldwide phenomenon (Kusek, 2016), with many advertisers aggressively pushing this new retail opportunity. In Japan, an example of this is depicted in an All Nippon Airways (ANA) magazine ad published in 2019. Recent survey conducted by Statista reported that gifting others is more common than self-gifting in Japan (Engelmann, 2019).

Japan Brand Personality

Aaker et al. (2001) developed brand personality dimensions specifically for Japan. They used the original five brand personality dimensions (Sincerity, Excitement, Competence, Sophistication, Ruggedness)

that were developed in the U.S. and replicated for Japan (Aaker, 1997). However, they were unable to replicate the dimension of Ruggedness and created a new dimension of Peacefulness. Based on the brand personality of Japan, the five dimensions and their adjectives include Excitement Dimension – talkative, funny, optimistic, positive, contemporary, free, friendly, happy, likeable, youthful, energetic, and spirited; Competence Dimension – consistent, reliable, responsible, dignified, confident, determined, patient, tenacious, and masculine; Peaceful Dimension – peaceful, shy, mild mannered, naïve, dependent, childlike; Sincerity Dimension – warm, thoughtful, and kind; Sophistication Dimension – elegant, smooth, romantic, stylish, sophisticated, and extravagant.

Conceptual Framework and Hypotheses

Merging the research streams reviewed in the previous section, a new conceptual framework is proposed in Figure 1. The first hypothesis H1 proposes that the brand personality of the same brand differs in self-gift versus giving gift to others. H2 proposes that in self-gifting situation the social role is not salient, and the brand personality exhibits traits that align with oneself. Furthermore, H3 proposes that the brand personality takes up a social role in gifting others and exhibits traits that align with the expectations of social norm.
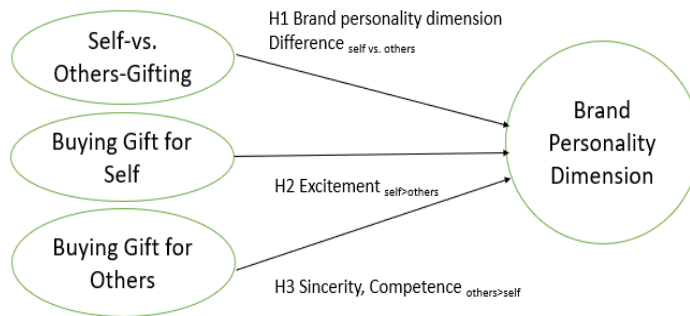
Figure 1. Conceptual Framework and Hypotheses
Source: Authors' own

In situations of gifting others, the social identity is activated. As a result, the social-self surfaces at a higher hierarchy than the personal self, thus resulting in the salience of a structural social role that prioritizes socially expected emotions and behavior. This situational demand of a social role prompts the person who is engaging in gifting others to shift their perception of brand personality toward the traits of the brand with their socially expected and acceptable brand personality. This is because brands have personalities just like people and brands personalities are essentially adjectives that describe the brands as perceived by consumers.

Contrarily, in self-gifting, the social role is not activated. Therefore, consumers perceive a brand's personality mainly from their individual self-perspective. As a result, the brand personality they perceive reflects the emotions of the individual in self-gifting. As reported in prior literature, the malleability of brand personality is subject to change depending on the situation. However, there is reason to believe that the salience of each brand personality dimension will differ between gifting self and others. Based on this argument, the following hypothesis is formed:

H1. Based on the malleability of brand personality, the difference in role salience, and the emotions activated in each role, brand personality of a product is perceived differently in two gifting situations.

According to previous research, excitement is prominent and happiness is maximized in self-gifting but not in gifting others. Thus, brand personality in self-gifting will more likely consist of stronger emotions of excitement than in gifting others. On this basis, the following hypothesis is formed:

H2. In self-gifting, the dimensions of brand personality that reflects excitement are more prominent than in gifting others.

According to prior research, gifting others is seldom impulsive or inconsistent purchase when compared to self-gifting. When it comes to gifting others, sincerity brand personality is prominent for consistent purchase. In addition, role salience is activated in gifting others, and the social self is at the top of the hierarchy of various roles. Thus, givers will more likely perceive the brand personality with socially acceptable attributes, such as sincerity and competence, than when they engage in self-gifting when social role salience is not activated. Therefore, the following hypothesis is formed:

H3. In gifting others, the dimension of brand personality that reflects sincerity and competence are more prominent than in self-gifting.

Data and Methodology
Survey Design

A questionnaire-based survey was developed to evaluate the brand personality of Japanese products that are popular among Japanese consumers. In addition to the questionnaire items of Japan brand personality from previous studies (Aaker et al., 2001), items for purchasing specific Japanese products as gifts for self and others were added. This aligns with purchase experience, product knowledge, and geographic origin of subjects in the survey. 280 subjects on campus were recruited from undergraduate students at a university in Japan during the month of January 2019. Details of the stimuli, instruments, and procedure of data collection are described below.

Stimuli

Gifts stimuli were selected from four popular tourist destinations: Tokyo, Kyoto, Hokkaido, and Okinawa. From each region, the two most recognized souvenir food gift products were selected based on a national survey conducted in Japan (Neo Marketing Inc., 2017). The brands presented include Tokyo Banana (sponge cake) and Kaminari Okoshi (crispy rice cake) from Tokyo, Nama Yatsuhashi (glutinous rice cake) and Seigoin Yatshuhashi (glutinous rice cake) from Kyoto, Shiroi Koibito (chocolate) and Jyagapokurru (potato chips) from Hokkaido, and Sata Andagi (donut) and Chinsuko (shortbread) from Okinawa. Using food products as stimuli to capture the perceived brand personality of a product is appropriate as food carries cultural identity. In addition, their contextual meanings are embedded at individual level and are not subject to the boundary of physical place (Borrero, 2014).

Brand Personality Instruments and Other Measurement

To measure brand personality, thirty-six adjectives categorized in five brand personality dimensions by Aaker et al. (2001) was applied. Respondents were asked to rate the extent to which a product describes each personality trait in a Likert scale of 1 to 5 (1 = strongly disagree, 5= strongly agree). Two questions were asked to examine intention to gifting self and others: 1) Intention to purchase for self (scale 1-4) and 2) Intention to purchase gift for others (scale 1-4). Respondents were also asked their gender, the region they were from (8 regions in Japan, 1 region outside Japan), and their age (>20 or <20 as 20 is the legal age in Japan).

Data Collection

A paper-and-pencil survey was conducted in multiple classrooms at a public university in the Northern part of Japan. Participants signed an informed consent form at the beginning of the survey. The participants were undergraduate students from various parts of Japan. Table 1 reports the geographic distribution and variation of survey respondents.

Table 1. Geographic Distribution of Respondents

Region	Count	Percentage
Hokkaido	10	3.7
Tohoku	47	17.41
Kanto	73	27.04
Chubu	40	14.81
Kinki	28	10.37
Chugoku	41	15.19
Shikoku	6	2.22
Outside of Japan	7	2.59

To avoid errors and blanks due to fatigue from answering too many questions, two sets of survey questionnaire of 4 brands from 4 regions per subject were prepared (Aaker et al., 2001). The two sets were administered within the same week and no students participated more than once. Each subject evaluated four brands from four regions, and 144 (36×4) personality traits were rated. After data cleaning, the number of valid responses was 251, with 139 for one set and 112 for another set.

Analysis and Results

The extraction of the brand personality dimensions for 8 brands was conducted using principal components and a varimax rotation in STATA 15. As a result, seven-factors were determined based on the following criteria (Aaker, 1997):

- all seven factors have eigenvalues larger than 1
- the seven-factor solution explains high level of variance (62 percent)
- a significant drop in scree plot until 7th factor

In the first round of factor analysis, two traits (dependent and contemporary) did not have high loading to any factor (value of 0.4). These traits were removed in the next round of analysis. The final seven components extracted are presented in Table 2.

Table 2. Brand Personality Dimensions Extracted

Traits	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Positive	.758						
Happy	.750						
Likable	.591						
Childlike	.566		.449				
Kind	.560						
Funny	.547						
Friendly	.530						
Talkative	.509						
Warm	.488						
Confident	.473				.415		
Dignified		.825					
Patient		.800					
Masculine		.721					
Determined		.712					
Tenacious		.646					
Responsible		.587		.471			
Energetic			.748				
Optimistic			.748				
Stylish			.603				
Spirited			.568				
Free			.566				
Romantic				.720			

Smooth					.641	.404	
Consistent					.633		
Thoughtful				.433	.594		
Reliable				.500	.524		
Peaceful					.410		
Shy						.745	
Sophisticated		.456				.641	
Elegant						.541	.477	
Extravagant						.445	
Naïve						.413	
Youthful							.694
Mild-Mannered								.793

Note:
1. Only values above .40 are reported.
2. Factors 1 and 2 extracted here are nearly the same as the first two brand personality dimensions in Aaker et al. (2001).

Accordingly, each factor was labelled based on the adjectives that are prominent within each component (Excitement-Happiness, Competency, Excitement-Energetic, Romantic, Sophistication, Youthful, and Mild-mannered). A comparison of the adjectives in each factor extracted from this study and that of Aaker et al. (2001) is presented in Figure 2. The comparison shows that the most synchronized dimensions are Factor 1 and Factor 2. It is not unusual that brand personality dimensions are not easily replicable (Avis et al., 2013).
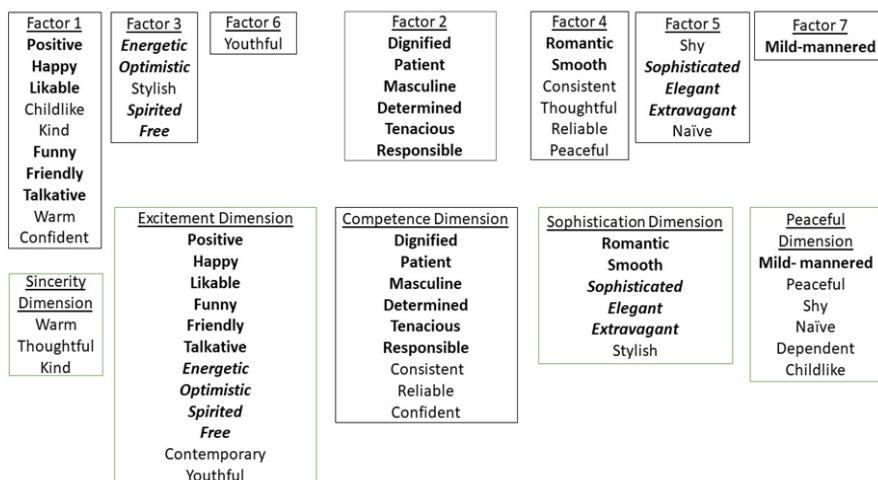

Figure 2. A Comparison of 7 factors extracted in this study and original 5 dimensions

Note:

1. In each factor, the adjectives are in descending order with the most important adjective or the factor with the largest coefficient as reported in Table 2.
2. Adjectives highlighted in bold depict matches found in the original brand personality dimensions (Aaker et al., 2001), which are placed below the factors. For example, in Factor 1, Positive, Happy, Likable, Funny, Friendly, and Talkative are identical to the adjectives in Excitement Dimension as reported by Aaker et al. (2001).
3. Factors 1, 3, and 6 are clustered to the left of the figure since they are close to the original Excitement and Sincerity Dimensions (Aaker et al., 2001).
4. Factors 1 and 2 extracted in this study is the same as the first two dimensions of Excitement and Competence (Aaker et al., 2001)

Hypotheses Testing

After seven brand personality factors were extracted, seemingly unrelated regression analysis was conducted using the factor scores as independent variables under multiple specifications. Seemingly unrelated regression analysis is appropriate to compare the difference between the coefficients of the factors in the two models of self-gifting and gifting others (Devlieger et al., 2016; Scott, 1966).

Consider the following equation for the model:

$$y_i = \alpha + [\![x_i]\!]^{\wedge}{}' \gamma + \varepsilon_i \qquad \text{(Equation 1)}$$

where

yi is purchase intention for self or for others,

xi is a vector of factor scores for brand personality dimensions,

εi is idiosyncratic unobservable error terms for individual i

Results of seemingly unrelated regression analysis are presented in Table 3. Column 1 reports self-gift scenario and Column 2 reports gifting others, which is derived from Equation 1.

Table 3. Seemingly Unrelated Regression Results

Dependent Variable	(1) Self-Gift	(2) Gifting Others
F1 Excitement -Happiness	.04** (.02)	.01 (.01)
F2 Competence	-.00 (.02)	-.03* (.01)
F3 Excitement - Energetic	.02 (.02)	.03* (.01)
F4 Romantic	.03* (.02)	.05** (.01)
F5 Sophisticated	.06** (.02)	.05** (.01)
F6 Youthful	.08** (.02)	.07** (.01)
F7 Mild-mannered	-.04** (.02)	-.06** (.01)
Constant	.62* (.02)	.72** (.01)

Observations	985	985
R-squared	.06	.08

Note. Standard error in parentheses ** p<0.01, *p<0.05

To test H1, based on the difference of the importance of brand personality in two gifting situations, a Wald test was conducted to ascertain the null hypothesis of the coefficients. This is obtained from the seemingly unrelated regression of the two models (Table 3) which are equal (UCLA statistical methods and data analytics, n.d.). The Wald test is appropriate for overall model comparison as it runs all the coefficients together (Stata.com, n.d.). The results of the Wald test are reported in Table 4. Since the *p*-value is less than 0.05, the null hypothesis is rejected. This indicates that the coefficients are not simultaneously equal to zero. Thus, H1 is supported. The results are in line with prior studies of Ward and Broniarczyk (2011). Although they did not measure brand personality but found that in the process of purchasing gift for others, consumers experience different emotions than if they were self-gifting. In addition, Irini et al. (2015) reported that when purchasing a product, the personal and collective identity impacts the decision differently.

Table 4. Wald Test Results for Testing H1

Chi square	Prob >Chi square
14.61	0.04

To test the hypothesis of H2 and H3, the coefficient obtained from the seemingly unrelated correlations (Table 3) was used to compare the coefficient of each factors. The relevant results of chi-square test and their *p*-value are reported in Table 5 below. Factors 4, 5, 6, and 7 were omitted as they were not in the hypotheses.

Table 5. Hypothesis Testing for H2 and H3

Dependent Variable	(1) Self-Gift	(2) Others-Gift	Chi-square Prob > chi-square (p-value)
F1 Excitement -Happiness	.04** (.02)	.01 (.01)	H2, 4.96, *p*=0.03
F2 Competence	-.00 (.02)	-.03* (.01)	H3. 3.39, *p*=0.07
F3 Excitement - Energetic	.02 (.02)	.03* (.01)	H2. 1.18, *p*=0.28

H2 hypothesized that the dimension of brand personality of excitement is stronger in self-gifting than gifting others. The comparison of the coefficients of Factor 1 Excitement-Happiness is statistically significant (Coefficient $_{Self =.04}$, $_{others=.01}$, $p = 0.03$) but not significant for Factor 3 Excitement-Energetic (Coefficient $_{Self =.02}$, $_{others=.02}$, $p > 0.10$). Therefore, H2 is partially supported. The significant results of Excitement-Happiness for self-gifting are consistent with prior studies. The dyadic gifting experiments of Baskins et al. (2014) took place in the U.S., and it was reported that people express happiness when gifting themselves a product. However, the same level

of happiness may not be maximized when gifting others. Nonetheless, people will choose a happier gift when they were first asked to consider their own preference of a gift for themselves before being tasked to choose a gift for others. The results are in line with that of Atalay and Meloy (2006), which was collected from undergraduate subjects and mall shoppers in the U.S. It was found that self-gifting increases subjects' overall effect. Similarly, Heath and Tynan (2015) analyzed 112 incidents, which was collected from 16 interviewed subjects. It was found that 83% of the incidents were classified as positive effect, which reflects immediate intensive arousal of emotions such as happiness, excitement, and delight after self-gifting. The results of Excitement-Energetic that did not find significant impact on self-gifting will be elaborated in the discussion section.

H3 hypothesized that sincerity and competence brand personality are stronger in gifting others than in self-gifting. While comparing the coefficients of sincerity, it was not found to be more prominent in gifting others than in self-gifting. In competence, the comparison yielded a marginally statistically significant difference, but the sign of the coefficient was negative (Coefficient $_{\text{Self}}$ =-.00, $_{\text{others}}$= -.03, $p = 0.07$). Therefore, H3 is not supported. Prior studies, not related to the gifting context, have reported that sincerity is an important brand personality in the U.S., Japan, and Spain (Aaker et al., 2001). On the other hand, competence is an important brand personality in the U.S. and Japan (Aaker, 1997; Aaker et al., 2001), but not in Spain (Aaker et al., 2001). The interpretation of these results will be elaborated further in the discussion section.

Discussion

While the results supported some of the hypotheses, the interpretation of some of the results deserves some elaborations. According to H3, Factor 2 Competency is found negatively and statistically significant when it applies to gifting others. This means that consumers avoid buying gifts that have competent brand personalities. This result is perplexing as Competence is the second most important brand personality dimension in this study and that of Aaker et al. (2001). According to Aaker et al. (2001), 10 global brands (e.g., McDonald, Chanel, Levi) were evaluated across product categories in Japan and Competence was found to be prominent. This may imply that Competence is contextual since Aaker et al. (2001) did not link brand personalities to purchase. Japanese cultural norms play an important role, which significantly results in the negative association of Competence when it comes to gifting others. The results of this study also showed that Competence brand personality did not matter in self-gifting. Recent research shows that brand personality of competence (i.e., ability and initiative) and warmth (i.e., trustworthy and friendliness that are closely related to sincerity) are vital to

identify intention and brand loyalty (Kervyn et al., 2021). This implies that these two dimensions of brand personalities are product specific (Phau & Lau, 2000) but did not fit into the food souvenir product in this study.

The results supporting H2 confirm that in self-gifting, brand personality traits that include adjectives such as positive, happy, and likable are prominent. This brand personality and their adjectives were not found to impact gifting others. The importance of the emotion of happiness has been reported constantly in self-gifting literature (Atalay & Meloy, 2006; Baskins et al., 2014; Sherry, 1983). The results reported clearly identified happiness as a brand personality for self-gifting which is distinct from gifting others.

In gifting others, brand personality that includes adjectives such as energetic and optimistic are found. Although energetic is categorized under 'excitement' (Aaker et al.,2001), Aaker (2016) reported that it is a separate dimension from excitement. It is possibly the most important dimension in differentiating a brand in the long term based on a large-scale longitudinal study conducted by the consulting firm Brand Asset Value. Regarding gifting others, apart from the confirmation of lack of happiness brand personality and the negative impact of competency, there are many more emotions or perceived brand personalities. Although the psychological distance between self-gifting seems to be smaller, it is larger in gifting others (Baskins et al., 2014).

Conclusion

This paper hypothesized that the activation of social role will lead to brand personality malleability, which results to different brand personalities of the same brand in gifting situations of self versus others. Empirical data was obtained from 8 brands in Japan and the responses of 251 respondents were collected and analyzed. The results supported two of the three hypotheses. This paper adds two contributions to existing literature. First, the conceptualization based on role salience in consumer research (Reed, 2004) and the relevant empirical results add new lenses to examine the difference between gifting self and others in general. By empirically analyzing two gifting situations, the use of brand personality malleability adds clarity to when consumers evaluate products differently. The second contribution of this research addresses brand personality malleability within the gifting context and adds more empirical evidence to a situational activated personality change in brands.

For managers, the results of this paper give further support to the viability of "one for you, one for me" (Ward & Tran, 2008) marketing campaign. The results indicate that consumers vary their emotional attachments to the same brand even when they are purchasing one for themselves and one for others. Based on these results, managers can craft

separate messages for self-gifting (e.g., happy) and gifting others (e.g., energetic). Simultaneously, this will support the marketing campaigns of 'one for you, one for me'.

The findings of energetic traits, within the excitement brand personality dimension, are exclusive for gifting others but not self-gifting. This is regarded as both strength and weakness in this paper. It is seen as strength since Aaker (2016) mentioned energetic as a separate dimension from Excitement (Aaker et al., 2001). It is however a weakness since there is lack of theoretical linkage of energetic to gifting others. Apple and Nike were cited as energetic brands (Aaker, 2016). Future research should explore energetic emotions more within the context of gifting. However, a puzzling finding in the research is the negative impact of competency in gifting others. This study used low-cost food-based gift items as stimuli, and this may be the reason for these results. Since Disney and Microsoft were cited as high competence brand personality (Aaker, 2016), future study should consider using higher-priced gift categories.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All of the data are included in the content of the paper.

Human Studies

This research followed the Ministry of Education, Culture, Sports, Science and Technology in Japan and its Guidelines for Research Ethics Involving Human Subjects, and the Science Council of Japan 'Code of Conduct for Scientists'. The research was approved by the Institutional Review Board at Akita International University, Japan.

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Self-Initiated Academics Work Adjustment: A Systematic Literature Review

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Abstract

Expatriation abroad for work and leisure is becoming the norm these days. This necessitates individuals to adjust to life in their new destination and work environment. This paper focuses on presenting a systematic literature review of how the phenomena of Self-Initiated Academics (SIEs) adjust to their work environment. Method: A systematic literature search was conducted by examining articles published in the field of SIE academics. No restrictions were placed on the date of publication because of the nascent nature of the subject of study. The following electronic databases were searched, where language was restricted to only English: Business Source Complete, Academic Search Ultimate, Scopus, Web of Science, and PsycINFO. Result: The result shows that SIEs face challenges that could affect their adjustment to life in a new country, culture, and work. Among these factors are family, local language proficiency, interaction with local hosts and expatriates, prior international work experience, and trainings that are provided at the workplaces. The differentiated treatment of expatriates based on their looks and the passport they hold by the HCNs (host country nationals) is a significant issue that was identified as well.

Keywords: Work adjustment, self-initiated academics, expatriation, working abroad

Introduction

The phenomenon of academics crossing international boundaries to work abroad is not new (Richardson & Wong, 2018). Higher education institutions in different countries recruit SIE academics for various reasons. For example, Saudi Arabia does not have adequately qualified indigenous personnel, thus recruiting academics from abroad is a necessity (Alshammari, 2012). However, for some countries, employing qualified individuals from foreign countries is a way to improve their international competitiveness (Trembath, 2016; Scurry et al., 2013). To provide clarity, Trembath (2016) identifies expatriate academics as people who work in higher education (HE) sector and have relocated abroad to teach and/or do research in a university with requisite legal requirements. Also, their duration of stay there is time-bound (Table 1)

Table 1. Trembath's (2016, p.116) criteria for someone to be considered as an expatriate academic

All of the following criteria must be upheld	None of the following criteria are included
- Have moved away from dominant place of residence (i.e., a long-term move) - Have moved across national borders - Employment is legal - Employment is time-bound (i.e., no intention to emigrate permanently) - Employment is related to teaching and/or research - Employment is based in a university	- Travelers (i.e., they have not moved away from their dominant place of residence). For example, conference attendees, academics on sabbatical or fieldwork - Managers or administrators employed in universities whose employment does not include teaching, or researchers not employed in this role at a university

The seminal study of Richardson and Mckenna (2002) on academics' self-expatriation highlights the motivation of SIEs. In their paper, they categorise expatriate academics as "mercenaries", "explorers", "refugees" or "architects". Academics who are mercenaries are motivated by only money. This means that they relocate to destinations where they think they can develop themselves economically (Austin et al., 2014). Academics who go abroad as explorers are interested in learning new cultures and are not concerned about economic gains (Richardson & Wong, 2018). The architect academics expatriate from their home countries to develop and strengthen their careers. Academics who are classified as refugees are those who escape from boring routines or even from a toxic relationship (Richardson & McKenna, 2002). However, Wilkins and Neri (2019) are of the opinion that this categorisation cannot be rigidly placed because of the fluid nature of reasons that surround going abroad. An SIE can be an explorer and mercenary

at the time, or vice versa. Scurry et al. (2013) contend that expatriates can change their motivation, depending on their personal circumstances and the environment they are in. This implies that the architect SIEs can change to mercenaries if they find opportunities to develop themselves financially. However, these groupings may not be so clearly defined as people may be influenced by different things at the same time (Selmer & Lauring, 2015). For example, SIEs may decide to improve their economic positions, meet people from other cultures, and develop their careers, while fleeing from hard conditions in their countries (Kuzhabekova & Lee, 2018).

Selmer and Lauring (2013) conducted a research on 600 SIE academics from 60 countries, including those working in 35 Northern European countries. Accordingly, they assert that refugee reason for expatriation has a negative effect on work adjustment. This study tried to validate the qualitative study of Richardson and Mckenna (2002), and the result indicates that those escaping difficulties back in their home countries faced adjustment challenges. Selmer and Lauring (2013) speculate that the other reasons for moving abroad are pull factors. Nevertheless, they do not have as much effect on adjustment compared to refugee reason which is a push factor. Certainly, from the psychological decision making literature, emotion-oriented decisions are likely to have negative consequences because they are not thought through properly (Pham & Avnet, 2009). The study of Selmer and Lauring (2013) indicates the possibility of a negative connection between 'refugee' reason of academic expatriation and work outcome. This may be the reason why SIE academics from developing countries experience problems adjusting to their work environment. In reality, these SIEs move abroad because they do not have an alternative.

The challenges SIEs face may not be necessarily linked to motivating factors prior to expatriation. Some of these factors may manifest themselves while in the host country. For instance, some SIEs from less developed nations may face difficulties at work because they are treated differently due to their origin, language, and even the way they dress (Al Ariss & O'zbilgin, 2010). Thirlwall et al. (2021) argue that adjustment challenges which SIEs experience is context specific. In their study of SIEs in the UAE, they found that the main issue that hindered adjustment was language. This means being able to communicate in the language of the host country could solve some of the difficulties SIEs face in their work adjustment. However, in certain regions, such as the Gulf, the temporary nature of the residency permits given to expatriates make it hard for SIEs to fully learn the culture and language of the host countries (Alsharif, 2022). According to Singh et al. (2021), SIEs have a better chance of adjusting to their work when the employers clearly clarify the roles or task undertaken by each individual employee. This is particularly important in the Gulf countries because of the job indigenisation policies,

where home country nationals (HCNs) who may not have the requisite skills are employed to fulfil quotas set by governments. In doing these, organisations may be forced to not clearly allocate roles performed by different employees in order to accommodate the HNCs's inabilities to perform their duties. The lack of role clarity may generate anxiety and uncertainty for expatriates, which may be detrimental to their work adjustment. Austin et al. (2014) and Richardson and McKenna (2016) highlight the contextual nature of adjustment. Whilst SIEs in Europe may experience work adjustment problems due to their backgrounds, those in the Gulf have to overcome language and role clarity issues to be able to adjust. Dickmann et al. (2008, p.755) further argues that "context is an essential variable in understanding research outcomes".

There is a general low retention rate of SIE academics in the Gulf countries because organisations focus less on professional and academic development in this region (Tahir, 2022). The exploratory study of Tahir (2022) asserts that collegiality is a major factor that contributes to expatriate retention and adjustment among academics that work in universities in the UAE. The short-term nature of contracts given to SIE academics seems to undermine this fundamental factor and leads to academic flight. As confirmed by Kalmey (2022), SIE academics tend to seek help from people of the same background. Collegiality seems to exist among individuals who come from the same culture. For example, SIEs from Western Europe tend to associate with each other. Kalmey (2022) further adds that there is interaction between SIE academics and local academics. This negatively contributes to lack of adjustment and may inevitably lead to academics seeking work elsewhere.

As underlined by Agha-Alikhani (2018), due to the mobile nature of today's personnel, it is imperative to understand the subjective experiences of the diverse groups of people who work in different occupations abroad. Furthermore, the adjustment challenges these individuals confront is not general but contextual (Danisman, 2017; Fu et al., 2017). With this backdrop, this study will review factors that affect the work adjustment of SIE academics. Since this area of SIE research is relatively nascent and under-researched, this review will consider both qualitative and quantitative studies.

1. Literature Search Strategy

The following electronic databases were searched, where language was restricted to only English: Business Source Complete, Academic Search Ultimate, Scopus, Web of Science, and PsycINFO. There was no restriction placed on dates of publication to ensure all published research was retrieved. The following combinations of search terms were used to retrieve all possible relevant articles. First, the general key words "expatriate", "self-initiated", "academic", and "work adjustment" were used. Subsequently, additional

keyword combinations were integrated into the search to account for close synonyms. For example, "expatriate" or "expat", "international worker" or "foreign worker", "self-initiated" or "self-assigned", "academic" or "professor", "teacher", "lecturer" or "researcher", "work adjustment", "work engagement", or "work performance", and "job performance" or "job engagement". The application of the above search criteria resulted in the retrieval of 202 articles. This was supplemented by a secondary search for articles listed in reference lists but not identified in the original search, which led to further searches of specific researchers who are active in the field of SIEs academics expatriation.

1.1   Studies Screening Process

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (Moher et al., 2009) process was utilized to screen the retrieved documents (Figure 1). The inclusion and exclusion criteria (Table 1 and Table 2 respectively) were adhered to as well.

Table 2. Inclusion criteria

- SIEs academics
- Peer-reviewed materials
- English-language text
- Containing the search terms in title, abstract, and/or article
- Empirical studies
- Study addresses SIE academics work adjustment experiences

Table 3. Exclusion criteria

- Conference papers and study reviews
- Non-English studies
- Repatriates, refugees, students, sojourners, immigrants, expatriate spouses, assigned expatriates
- Book chapters
- Opinion, editorials, and news items
- Reviews of other studies that have been included

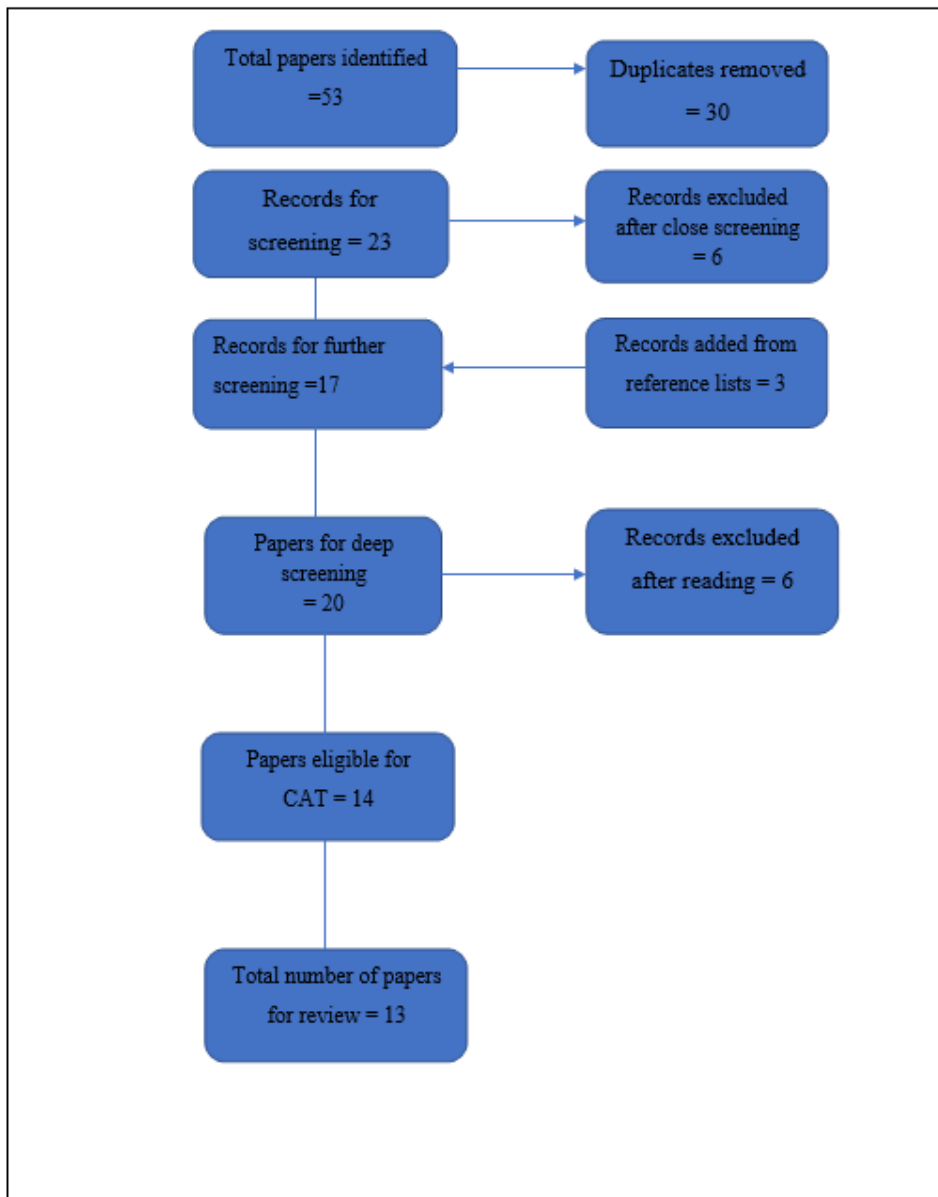**Figure 1.** PRISMA process for literature search and retrieval

2. Quality Assessment Process

The quality of selected papers was assessed using the critical appraisal tool (CAT), which was developed by Hawker et al. (2002). This assessment tool was chosen because it is useful with research that has varied data and different subject areas. This review has varied studies that utilised qualitative and quantitative methods.

The current research acknowledges that there are other quality appraisal tools that could have been suitable. A good example is the traditional levels of evidence (Canadian Task Force, 1979), which places more emphasis on randomised controlled trials. Another example is Downs and Black scale (Sousa et al., 2017), which uses a 27-item measuring scale. Since the current study focuses on studies that have heterogeneity, the use of hierarchies of scales classify studies that are not methodologically quantitative, are deficient, and without expert opinions.

The Hawker CAT uses nine evaluation principles across a research paper, where a score of 1 (very poor) to 4 (good) is allocated to different sections (Hawker et al., 2002). Therefore, a research article can have a general lower quality score of between 9 (very poor) to a higher score of 36 points (very good). The papers selected for this review were all evaluated using these criteria and the ones that had a score of twenty and above were added to the review (Firn et al., 2016). After using the Hawker's CAT quality assessment tool, thirteen papers scored between 21 and 34 and were included in the final review for analysis.

Table 4. Review papers about SIE academics

Author	Date	CAT	Country	Method	Scope
1. Agha-Akhilani, B.	2018	33	Denmark	Qualitative	The study explores the adjustment experiences of 12 academics.
2. Alshammari, H.	2012	21	Saudi Arabia	Quantitative	The study evaluates whether previous and marital status affects SIEs working in a university. There were 207 academics from 2 universities.
3. Asif et al.	2020	24	Saudi Arabia	Qualitative	Describes the experiences of 13 non-western academics working in a university.
4. Austin et al.	2014	26	UAE	Qualitative	The study describes the motivation, satisfaction, and commitment of 33 academics working in 13 universities.
5. Danisman, S.	2017	28	Turkey	Qualitative	The study explores the attitudes of 18 participants from 13 different countries towards the culture of host country.
6. Froese, F.	2012	32	South Korea	Qualitative	The study explores the motivation and adjustment of 30 SIE academics from 30 different countries.

Author	Date	CAT	Country	Method	Scope
7. Fu et al.	2017	34	Hong Kong	Quantitative	The purpose of the study is to investigate organizational socialization aspects of 207 teachers from 4 English speaking countries.
8. Halim et al.	2018	22	Malaysia	Quantitative	The study investigates the adjustment of 101 SIE academics working in a university.
9. Isakovic and Whitman	2013	34	UAE	Quantitative	The study investigates the adjustment experiences of 207 academics working in 10 universities.
10. Richardson and Wong	2018	29	Malaysia	Qualitative	The study Explores the motivation and adjustment of 17 expatriates working in 4 universities.
11. Romanowski and Nasser	2014	28	Qatar	Qualitative	The study presents the experiences and conflicts of 20 professors.
12. Selmer and Lauring	2015	30	Nordic countries and the Netherlands	Quantitative	The paper examines the cognitive and affective reasons of 428 academics.
13. Selmer and Lauring	2011	31	Nordic countries and the Netherlands	Quantitative	The study investigates the marital status and work outcomes of 428 academics working in 34 universities.

3.   Study Designs of Papers Identified

The current review identified 13 articles (Table 4) for final analysis. The papers were published between 2011 and 2020. This shows the nascent nature of SIE academics' research. In terms of the research methodologies that were used in the identified records, it seems studies that used qualitative methodology are slightly higher than those that adapted quantitative. While 60% are qualitative (Agha-Akhilani, 2018; Asif et al., 2020; Austin et al., 2014; Danisman, 2017; Froese, 2012; Richardson & Wong, 2018; Romanowski & Nasser, 2014), the other 40% are quantitative (Alshammari, 2012; Fu et al., 2017; Halim et al., 2018; Isakovic & Whitman, 2013; Selmer & Lauring, 2011; Selmer & Lauring, 2013). Interestingly, the selected research papers originated mainly from Europe (Northern Europe and Holland), the Gulf (Saudi Arabia, Qatar, UAE), Turkey, and East Asia (Hong Kong, Malaysia and South Korea). The concentration of studies in these

countries means that universities employ many SIE academics. This may be an indication of the emerging nature of higher education in these countries and not having enough local talents to fill vacancies.

The sample sizes of the studies in the review vary, ranging from n= 10 to n= 428 (Agha-Akhilani, 2018). This is seen for a qualitative study (Selmer & Lauring, 2015) that uses quantitative methodology. However, the research of Agha-Akhilani (2018) is a qualitative longitudinal study (first a sample size of 12 and then 10). Typically, in a qualitative research, the sample sizes are smaller (Asif et al., 2020). The larger population samples come from the non-qualitative articles (Isakovic & Whitman, 2013; Selmer & Lauring, 2011). This is expected as qualitative research focuses more on details or deeper understanding of a phenomenon. On the other hand, quantitative research assesses a larger population for generalisation.

In relation to the objectives of the selected papers, the ones that utilised qualitative methods are exploratory (Agha-Akhilani, 2018; Froese, 2012), while others assessed the everyday feelings of participants (Austine et al, 2014; Romanowski & Nasser, 2014). The quantitative articles are cross sectional and assess different facets of adjustment among SIEs. For example, Selmer and Lauring (2011) investigated the effect of marital status on adjustment, i.e., whether having a family around helps the adjustment process. In addition, Selmer and Lauring (2015) further assessed the relationship between cognition and affectivity on work adjustment. Halim et al. (2018) and Isakovic and Whitman (2013) also investigated the experiences of expatriate academics in Malaysia and the UAE respectively.

4.   Factors that Affect SIE Academics Work Adjustment

Getting used to life in a new country, culture, and work can be difficult (Richardson & Wong, 2018). Leaving home, family, friends, and familiar surroundings to move to a new country surrounded by new people comes with many challenges, including the inability of not speaking the language of the host country (Kalmey, 2022), dealing with unfamiliar bureaucracy in the host country (Singh et al., 2021), accompanying family members feeling unhappy (Froese, 2012), and work policies being different from home country (Thirlwall et al., 2021). These situations may eventually hasten the expatriates to return to their home countries earlier than planned. The next sections of the paper outline the issues that were highlighted previously in relation to the work adjustment processes of SIE academics.

4.1   Competence of the Local Language

Being able to comprehend the host country's language has been mentioned in the wider scholarship as being important in adjusting to work and a new country (Asif et al., 2020; (Alsharif, 2022). This is because language

plays a major role in the way people make sense of their living environment. Getting exposed to the language of the host country may not only be a means of understanding its culture, but it also enables expatriates grasp crucial information. Some of this information can be critical in communicating with HCNs at work and interacting with the locals in the community outside of work. Danisman (2017) points to the positive relationship between understanding the language of the host country and adjusting to work. The author argues that language does not only help in interacting with the HCNs, but could have a positive influence on success at the workplace. The implication of the host country's language has also been raised by Richardson and Wong (2018). While commenting on the outcome of their research on expatriate academics in Malaysia, they argue that speaking or at least having some comprehension of the host country's language may aid both work and general adjustment. Froese (2012) established that SIEs with good Korean language ability are able to interact with HNCs, which may improve productivity at work. Certainly, mastering the host country's language has been described as an essential means of getting used to the immediate surroundings at work and outside work (Danisman, 2017). Halim et al. (2018), however, found that being able to understand the local language had no effect in how SIEs adjusted to life in Malaysia. This is because locals in Malaysia speak English. Isakovic and Whitman (2013) came to the same conclusion about the importance of Arabic language proficiency for expatriates in the UAE. They suggest that UAE is a country with many expatriates and English has become the lingua franca.

In relation to Saudi Arabia, Asif et al. (2020) affirm that Arabic language knowledge is extremely important. This is because as opposed to other Gulf countries, Saudis are conservative and homogeneous. Therefore, it is recommended that expatriates gain some understanding of Arabic language in order to interact with the locals and learn their culture (Richardson & Wong, 2018). Conversely, Alshammari (2012) mentions that there may not be a connection between being able to comprehend the host country's language and getting used to a new workplace. This may be partly explained by the fact that the participants in his research came from countries that speak Arabic. Froese (2012) further argues that the host country's language proficiency may not necessarily be a priority for certain category of SIEs. In other words, demographics, the individual's age, and length of stay may dictate the willingness to learn a new language. Thus, learning the host country's language may not be of priority for expatriates who are young because in most cases their duration of stay tends to be shorter. Furthermore, the literature indicates that knowing the language of the host country may not be of value in countries with large number of SIEs such as the UAE or in Malaysia where English is the primary means of communication (Danisman, 2017). However,

Tahir (2022) argues that comprehension of the host country's language is crucial in certain destination, including those countries with a large expatriate population. One of these countries is Saudi Arabia. Despite its sizeable SIE population, the use of Arabic language seems be a main concern for many SIEs. The fact that the host country's language knowledge may be a precursor to adjustment depends on the environment where the expatriates live and work, thus pointing to the subjective nature of adjustment (Haslberger et al., 2014). Agha-Alikhani (2018) utilised the P-E fit model to demonstrate that the host country's language proficiency may not be a requirement to work adjustment because this depends on the person and their environment.

4.2   Importance of Family

The significance of family in relation to expatriate adjustment abroad is emphasised in the expatriation literature (Danisman, 2017; Selmer & Lauring, 2015). Danisman (2017) confirms that when the family is happily settled in the new country, adjustment becomes easier. She found that SIE academics who were accompanied by their family members felt more content with situations in the host country. Froese (2012) concurs with Danisman (2017) that the comfortability of the family helps expatriates adjust to their work abroad. His research in South Korea established that expatriates who had family members with them were more comfortable than those who did not have their families with them. The impact of family to adjustment is also established by Selmer and lauring (2011). Their study found that faculty members who were accompanied by their families experienced better work outcomes and performances. The fact that SIEs relocate abroad on their own volition means they collaboratively plan decisions to relocate to a certain destination abroad with their family members, and this may be the reason why adjustment is easier (Haslberger et al., 2014). Froese (2012) adds that the spousal adjustment depends on specific factors of the host country. For example, in the Arab culture, it is normal for women to cover their heads and their bodies when outside their homes. However, getting used to this custom, which might seem peculiar to many SIEs, can be crucial. The study of Jackson and Manderscheid (2016) supports the argument that expatriate women who adapt to these Saudi customs tend to adjust better to life there, which could concomitantly assist the working spouse's adjustment.

4.3   Previous Work Experience Overseas

Prior work experience abroad is considered an important pillar that contributes to the adjustment of expatriates (Isakovic & Whitman, 2013). Halim et al. (2018) argue that SIEs who had prior foreign work experience tend to adjust easily to life in a different culture than those with no foreign exposure. Data from their research on SIE academics who came from various

countries to work in Malaysia indicates that academics who worked in other countries reported fewer adjustment problems. Living and working with HCNs and people from other cultures is what gives SIEs the confidence and means to cope with cultural situations both at work and outside (Halim et al., 2018). Surprisingly, Alshammari (2012) argues that there may be no relationship between previous foreign experience and adjusting to work. He attributes such an outcome to the complex and fluid nature of international cross-cultural adjustment. However, 81% of those who participated in his research spoke Arabic. Thus, it is evident that the mastery of the host country's language can have a positive impact on adjustment (Froese, 2012). However, Isakovic and Whitman (2013) add another dimension about the significance of the host country's language to work adjustment. According to them, it is not the length of exposure to a people's language but the quality of the experience. In other words, experience overseas has to be suitable and appropriate to what is needed by the SIEs. The importance of cultural experience over duration is also supported by Halim et al. (2018). They claim that SIE academics who worked in Indonesia (a country that is geographically and culturally close to Malaysia) before, adjusted to life in Malaysia. This may be due to the cultural similarities of the two countries.

Froese (2012) asserts that SIEs who had been exposed to Korean culture through individual interest and family connections reported better general and work adjustment outcomes. This is congruent with the research of Danisman (2017), which affirms that SIEs who marry from the host country are more likely to adjust than those who do not. In addition, Danisman (2017) contends that when the culture of the host and home country are similar, the adjustment process may be easier. Conversely, Selmer and Lauring (2011) are of the view that cultural similarities between the host and home country may in certain situations be a detriment to SIEs. This is because SIEs may assume some cultural practices in the host country to be the same as their home country and as a result may not pay enough attention to some nuanced cultural situations in the new context. Invariably, these SIEs may not be able to fully adjust. According to Stoermer et al. (2019) and Haslberger et al. (2014), cultural exposure is particularly crucial in countries with homogenous culture, such as Korea and Japan. This supports the argument that context can be a major factor in adjustment. In other words, adjustment can be influenced by the environment and the individual's personality (Haslberger et al., 2014).

4.4 Other Expatriates

According to Black et al. (1991), interacting with the HCNs is a fundamental aspect to their adjustment model. However, Stoermer et al. (2019) and Agha-Akhilani (2018) opine that this may not be applicable in all contexts because adjustment is not only subjective but multifaceted too. For

instance, meeting other expatriates, for some people, can be as important as interacting with the locals (Bozionelos, 2009). Fu et al. (2017) support the significance other expatriates can have in adjustment and emphasise how crucial networking with other expatriates is, especially in terms of socialisation and emotional support. Furthermore, interacting with other SIEs can be an opportunity to share information about the host country's culture (Asif et al., 2020). Accessing local information pertaining to legal issues about the host country from other expatriates might be particularly useful for SIEs who generally do not get support from their employers. McKenna and Richardson (2016) recommend that employers should institute mentorship programmes at the workplace because SIEs feel more comfortable with other expatriates. This may not only help them navigate the work policy and procedures, but may be another route of getting information about the wider culture of the host community. While studying SIEs in Korea, Froese (2012) found that SIEs prefer to seek social support from people of similar backgrounds. Besides fellow SIEs, Asif et al. (2020) adds that students can be a good source of support and the teacher student relationship can be significant as well. SIE academics who not only immersed themselves in their students' work, but also engaged with them, reported better adjustment.

4.5   Training at the Workplace

Career-oriented HRM practices for new entrants to the workforce have been stated in the literature to have positive impact on the adjustment of SIEs (Fu et al., 2017). These practices introduce ways for the employers to show their appreciation to their new SIE workers, which fosters positive attitudes and work outcomes (Isakovic & Whitman, 2013). One of these practices is the provision of training. Certainly, training has been mentioned as a way of developing employees' skills and capabilities at the workplace and outside. Based on evidence from their research, Fu et al. (2017) assert that SIE academics who were given training by their employers in Hong Kong showed better adjustment capabilities. Therefore, they recommend that organisations who employ SIEs should provide thorough and clear trainings about what the new SIEs are expected to do. In addition, organizations should also encourage informal support system through the establishment of social networks. Froese (2012) attests that SIE academics employed by larger universities in Korea adjusted better than those from smaller universities. This could be because they provided longer and more complex cultural training. Also, bigger institutes of higher learning employ more SIEs, which create a community support bubble.

4.6   Treating People Differently

In their critique of adjustment as "being a point to be reached", (Wilkins & Neri, 2019), in terms of a psychological comfort level, Hasleberger et al. (2014) suggest that adjustment experiences that people go through in a new country is underpinned by contexts because each individual's interpretation of situations can be different. The complexity and context specificity of adjustment has also been supported by Austin et al. (2014). According to them, people from non-European backgrounds are treated differently in the Gulf countries, and this may affect the adjustment of these individuals. Another study from the same region had the same conclusion in the way non-Caucasian academics are treated (Romanowski & Nasser, 2014). Hence, this study argues that as opposed to their European colleagues, SIE academics of colour may be judged in a different manner because of their identity and the type of passports they hold. As a result of policies of this nature, it is not a surprise that academics from Asia and Africa may feel less valued. This stratified classification sometimes forces some academics who hold dual nationalities to use their adopted countries' passports, for example, UK, USA, Canada, Australia, etc., to try to be at parity with their white colleagues in terms of equality and remuneration (Romanowski & Nasser, 2014). The study of Romanowski and Nasser (2014) further highlighted that some non-white participants narrated how they often identify themselves as nationals of Western countries so that the locals can accept and respect them. "Some faculty members may choose an identity that might not be the true core of their being but rather an identity that is sociably acceptable" (Romanowski & Nasser, 2014, p.662). From this quote, it is apparent that there may be positive discrimination towards certain ethnicities such as Europeans.

In relation to SIE academics in Saudi Arabia, the research of Asif et al. (2020) is in line with that of Austin et al. (2014) and Romanowski and Nasser (2014), which also identifies discrimination against academics of colour in Gulf countries. They argue that the participants of their research, who were all non-western academics, were nervous about their job security. These participants claim that HR policies in their institution are skewed in favour of those with Western citizenship. As a result of this perceived stratification of people based on the type of passports they hold, there is a general fear for their jobs. Thus, they are forced to work harder and be nicer to their managers. These academics feel such discriminatory policies negatively contribute to their ability to adjust. Interestingly, three studies from different Gulf countries (UAE, Qatar, and Saudi Arabia) show that adjustment is not one size fit all, but can be influenced by context. Thus, stratified remuneration based on one's nationality affects adjustment and may be specific to these regions and other Asian countries. Stoermer et al. (2019) found that discrimination against

expatriates is prevalent in countries with closed and homogenous cultures, such as Japan and South Korea.

4.7   Personal Level Characteristics that Help in Work Adjustment

Personal level features may be critical in the work adjustment process of SIEs (Agha-Akhilani, 2018). A good example includes the SIEs with personal drive to pursue careers abroad. Halim et al. (2018) assert that certain attributes, such as being open-minded can have an effect on work adjustment. Furthermore, personality traits, such as the ability to accept change and having positive outlook towards the new country and its people may provide a means to getting used to the new work environment. Froese (2012) found that SIEs with interest in certain countries and culture have capabilities to adjust than those driven by other things, such as finance and travel. Those who took part in the research of Froese (2012) stated that their previous interests in Korean way of life were the reason they were able to settle into their new country. Richardson and Wong (2018) came to the same conclusion about expatriate academics in Malaysia. Subsequently, those with pre-migration interest and those that had relocated from countries with geographical proximity to Malaysia reported better adjustment process than those who did not have these plans.

In relations to overcoming adjustment difficulties, SIEs tend to possess personal motivational drivers (Agha-Akhilani, 2018), which encourages them to not only look for employment overseas, but to persevere difficult situations. Froese (2012) suggests that there could be pre-disposing circumstances that makes people endure several conditions abroad. A good example is lack of employment and undesirable work conditions in the home countries of SIEs, which may necessitate SIEs to withstand harsh and discriminatory HR policies in host destinations. Through interaction with HCNs (Fu et al., 2017), SIEs tend to overcome adjustment difficulties. Danisman (2017) claims that in Turkey, SIEs academics who portrayed a willingness to meet and learn from the HCNs were able to overcome adjustment problems. In the context of Gulf, however, organizational HR policies sometimes curtail the interactions between expatriates and HCNs. Since expatriates are housed in protected compounds, the possibility of associating with the local population is almost impossible (Romanowski & Nasser, 2014).

5.   Discussion

There are a number of fundamental issues highlighted about the papers that were reviewed. As far as the study setting is concerned, it is evident that most of the studies were conducted in countries in Asia. However, 12 of the 15 papers emanated from countries in Asia. This might be due to the recent expansion of higher education institutions in these destinations (Asif et al.,

2020; Austin et al., 2014; Richardson & Wong, 2018). Also, the limited supply of qualified instructors in the host countries to teach in institutes of higher learning may have resulted in the high numbers of SIE academics working in these countries (Haslberger et al., 2014). Certainly, there has been a huge increase in the number of SIE academics wanting to work in universities in the Gulf to fill vacancies that could not be covered by the locals.

Another observation from the current review indicates that getting used to life in a new country may not only be subjective, but also quite complex and multifaceted. As argued by Agha-Alikhani (2018) and Stoermer et al. (2018), adjustment is not one dimensional as traditionally suggested (Black et al, 1991). This is because it can be influenced by the context where the expatriates live and work. Thus, what affects adjustment in one country may not apply in a different country (McKenna & Richardson, 2016). In addition, getting used to a new culture is varied and continuous(Farndale et al., 2019). Adjusting to life in a foreign country also depends on the individual expatriate as there are people who are inherently able to adjust, while others do not (Thirlwall et al., 2021). This portrays the subjective nature of adjustment as suggested by Haslberger et al. (2014). Therefore, there must be a fit between the persons and their surroundings. The confluence of the host country's culture, the individual's ability, policies at the workplace and other factors brings the claim of McKenna and Richardson (2007) to mind. According to them, adjustment is a "fluid" phenomenon which may never be realised. In other words, SIEs develop ways to cope with their situations.

## 6.	Practical Implications

The objective of this review was to investigate the factors that affect the work adjustment of SIE academics. The current review has identified the significance of comprehending the language of the host country (Alshahrani, 2022). Thus, it is imperative for employing institutions of higher learning to help academics develop some basic understanding of the host country's language. As suggested by Showail et al. (2013), comprehension of the host language may even be more critical in destinations whose culture is conservative and is closed to outsiders, such as Saudi Arabia and Korea. When a foreigner speaks the language of the host country, evidence points to the fact that HCNs go out of their way to welcome them and make them feel settled (Danisman, 2017). Family support has also been identified as a key pillar that positively contributes to work adjustment (Thirlwall et al., 2021). Employing organisation should help their SIE employees and families learn the language of the host country because this may stabilise the adjustment process and thus make the SIE stay longer.

According to the current review, possessing the right know-how and skills should not be used as a prerequisite for employment. Institutions in host

countries should consider employing SIE academics with prior foreign experience that is similar to that of the new country (Isakovic &Whitman, 2013). Having a foreign experience may be useful in expatriation, but when the gained experience is similar to that of the host country, it becomes more beneficial. Certainly, being familiar with the culture of the host country may give the SIE the repertoire to confront and adapt to situations that might otherwise have been challenging. Employing academics with experience similar to the host country may also help organizations save money in the long run that would otherwise have been used for cultural training. Related to having some experience of the host country's culture is the issue of discrimination based on ethnicity, colour, and place of origin. This review has found a compartmentalization policy that may be engrained in HR policies of Asian countries. The policy of remunerating SIEs based on their origins and the type of passport they hold can be demotivating, disheartening, and demoralising to many SIEs (Asif et al., 2020; Austin at al., 2014; Romanowski & Nasser, 2014). Inevitably, this may affect the productivity of these SIEs. Therefore, SIE academics that wish to self-expatriate to these countries should be made aware of this practice as it can be a shock upon arrival. Employing institutions should try to be upfront and candid with academics about this cultural practice so that people can know what they are getting into.

7.   Limitation

This study has several limitations. First, the nascent nature of SIE academics research may have limited the number of review articles. Future research could expand the search criteria and include more articles, books, and book chapters. Furthermore, most of the articles included are qualitative and the inclusion of more quantitative articles may have generated a different outcome. Second, the review was undertaken by only one researcher. This may have affected its depth and scope as most reviews are conducted by a group of researchers.

Conclusion

Evidence from this review suggest that adjusting to life in a new country may be subjective and multidimensional (Hasslberger et al., 2014). Furthermore, adjustment is contingent on the context and the individual expatriate. Notwithstanding, the current review identified the need to find a fit between the SIEs and the environment where they live and work (Agha-Alikhani, 2018). Despite these realities, if individuals decide to self-expatriate at their volition, they may face various impediments, which is specific to a destination country. However, within the context of this review, having the ability to comprehend the language of the host country may be essential. This outcome is congruent with the findings of other studies (Asif et al., 2020;

Thirlwall et al., 2021). In agreement with Jackson and Manderschied (2016), the accompanying family of the expatriate is another important factor, especially for countries where the family unit is central to the culture, such as Saudi Arabia. In line with the study of Isakovic and Whitman (2013), this review emphasises the importance of having a previous work experience abroad that is similar to that of the host country. In addition, expatriates have to be realistic about the destination they are relocating to as there may be certain cultural norms that are difficult to deal with, such as remunerations that are based on ethnicity and the passport an individual holds.

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Corporal Punishment as an Educational Practice for Burundian Children's Maladaptive Behavior: The Assessment of the Disposition of Children Education Stakeholders

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Abstract

Our study aims to investigate the factors that produce and sustain the use of corporal punishment in education in Burundi. To collect data, we used a life story approach with semi-structured interviews and direct and indirect observation of educational actors. Analysis of the empirical corpus of 50 educational actors enabled us to highlight the social and educational experiences of our interviewees drawn from their childhood. Religious beliefs, the personality of the educators and psychic tensions linked to the general context are the main reasons for the use of corporal punishment. The majority of our interviewees, including teachers, support the use of corporal punishment, provided it does not exceed certain limits. Sensitivity to the effects of corporal punishment on children is generally low. It changes and rises to physical and economic effects, which arise when corporal punishment results in serious bodily harm, requiring prolonged hospitalization of the victim. For our respondents, not punishing children would be synonymous with cowardice, a violation of biblical scripture, with a high risk of exposing children to more dangerous consequences. Finally, to prevent and reduce the early onset of maladaptive behavior in children, the introduction of positive parenting programs is indispensable in Burundian education.

1.0   Introduction

In many countries around the world, corporal punishment of children is still practiced as part of educational methods. In Africa in general, and in Burundi in particular, in addition to ratified international texts, national legislation has been drawn up to protect and deal with all forms of violence against children. In spite of this, parents and others involved in educational process still subject children to various forms of violence, known as corporal punishment, either to punish, correct or for other purposes.

The review of the literatures show that the aspect that affects parents and teachers in their mission to educate children has long remained uncharted territory. It was at the dawn of the 21st century that methodical and rigorous research into this social and family phenomenon came to fruition (Lachal, 2018). With the aim of changing mentalities regarding parent-child relations, and addressing the misunderstanding of childhood, "Korczak set out to deconstruct, on a daily basis, all the situations in which adults and society fail to show respect for children" (AFJK, 2010). Enlightened by the results of this study, decision-makers in various countries became aware of the effects of corporal punishment on children's lives, and from 1979 onwards, some of them decided to ban it.

On the European continent, the first country to ban corporal punishment in 1976 was Sweden, followed by 46 countries in 2015 (Global report, 2015)*, but* democratic states such as Canada, France, the UK and the USA have yet to ban corporal punishment in the family.

From this period onwards, differences of opinion arose as to whether or not corporal punishment should be used to educate children, but conclusions drawn from the results of scientific work settled the matter. According to these studies, there is no such thing as good and bad corporal punishment, because by dint of making this differentiation, it will be difficult to get away with it (Lachal, 2018 b). According to this author, nuancing ill-treatment from corporal punishment seems complex, as the disarticulation between the two aspects does not exist. It's more a question of degree, but not nature, as both produce the same effects.

A SOFRES survey in France (1999), proves that 84% of parents questioned hitting their children and 10 years later, a similar survey shows that 81% remain opposed to banning corporal punishment (Lachal, 2018 c). In China, when children of elementary school age begin formal schooling, their parents may be more inclined to use harsh discipline to motivate children, to achieve high social and academic goals (Fang & al., 2018). More

fundamentally, in this country, children of elementary school age are perceived as being able to understand, which is known as dongshi (Fang & al., 2018 b) and parental tolerance may decrease once children reach dongshi age. In Canada, studies of family violence have been carried out using a quantitative approach, and have shown the link between the reported frequency of severe violence experienced during childhood, and its legitimacy on the one hand, and minor violence and its legitimacy towards children within the modern family on the othe (Jamal & al., 2011). Some authors have shown that the more people have been confronted with violence in their childhood, the more they adopt violent behavior (Gagné & al., 2007, Jamal & al., 2011), and the more likely they are to apply this type of discipline with their own children (Rodriguez & Price, 2004) .

In Nigerian schools, the use of corporal punishment is often considered an integral part of education, and retains its place in teaching. Educators believe that corporal punishment has the power to reduce bad behavior among educated children, and increases the hope that the latter will adopt desired behaviors in the future, even in the absence of their caregivers (Ojo, 2018). In this Nigerian state, under the impulse of anger and through the use of the whip, some perpetrators have taken the practice very far, injuring, disabling and even leading to the death of some children in certain secondary schools (Olupohunda, 2013).

In the context of Burundi, there hasn't been significant research attention given to this issue thus far. The limited data we have comes from the 2016-2017 Demographic and Health Survey, and it paints a concerning picture. According to this survey, nearly all children between the ages of 1 and 14 (90%) have already experienced some form of violence. Among them, 66% have endured physical punishment, and 23% have suffered from psychological aggression. Moreover, adolescent girls aged 12 to 17 face a high risk of early marriage, despite its illegality, with rates reaching as high as 38%.

The absence of the diversity of reference studies does not deny the existence of this corporal punishment, because despite the implementation of the ministerial order of 17/07/2017 prohibiting this form of educational practice in schools, cases of violence related to it are reported in daily newspapers, by the media and associations working in child protection. On October 28, 2019, a pupil at Ecofo Carama lost her life after being beaten by her teacher. The teacher left the school and the principal was arrested for questioning (IWACU Journal, 2019).

 If we return to the effects of corporal punishment on children's development, some are easily identifiable by externalized behaviors, while others vary according to, the child's personality.

In the course of a child's development, questions relating to sleep disorders, eating disorders and behavioral problems worry parents and their

surrogates, and consequently prompt them to reflect on how to respond to maladaptive behavior. In practice, when verbal reprimands fail, parents' resort to punishment (Maigret & Gentaz, 2023). While the quantitative approach adopted by these studies offers a global view of the phenomenon as perceived by parents and teachers, the fact remains that their scope remains limited in terms of the issues faced by other educational players such as social workers. What's more, these studies ignore the psychosocial dimension in its ecological aspect in understanding the phenomenon.

1.1. Theoretical framework

The following paragraphs presents the theoretical framework of the study, definitions, the material and methods, the results and discussion, and finally the conclusion.

This article is based on the ecological social model described by Bronfenbrenner (1979). In his theoretical explanations, the author emphasizes two key concepts formulated as follows: (a) individuals are nested in a multi-level environment and (b) these levels interact to produce outcomes. Bronfenbrenner goes on to say that the framework comprises four levels of factors affecting the individual. These are (1) the individual, (2) the microsystem, which describes the immediate setting (e.g., family, home, peer groups) and interpersonal relationships, (3) the exosystem, which includes institutions and social structures (e.g., work, neighborhood, social networks) and (4) the macrosystem, i.e., the cultural, historical and political context (Bronfenbrenner, 1979, p.277).

In its philosophy, this approach puts the child to be educated at the center of concerns, and aims to improve his or her well-being. For this work, this approach is relevant, as it will help us to meet our objective, which is to collect qualitative data on the factors that motivate educational actors to resort to corporal punishment and to maintain it in their educational practices.

1.2. Definitions

Thus, in the context of our study, we consider corporal punishment to be a form of violence that results from a complex interaction of individual, relational, social, cultural and environmental factors. "Physical violence or abuse is the deliberate use of force against any part of a child's body, resulting in or having resulted in non-accidental injury" (Trocmé & Wolfe, 2001). The scientific literature has identified five categories of physical abuse (Larrivée & al., 2009).
  1) Shaking, pushing, grabbing or throwing, where the abuser pushes or pulls a child or shakes a baby.
  2) Hitting with the hand, including slapping or spanking.

3) Punching, kicking or biting, or any other blow given with another part of the body (e.g., with the elbow or head).
4) Hitting with an object, such as a stick or belt, or throwing an object at a child.
5) Other forms of physical abuse, where the abuser shakes, strangles, stabs, burns, poisons or uses excessive physical force.

The United Nations Committee on the Rights of the Child defines corporal punishment as "any punishment involving the use of physical force and intended to cause some degree of pain or discomfort, however light" (Report of the United Nations Committee on the Rights of the Child, 2007). Corporal punishment, on the other hand, encompasses any action taken with the aim of causing physical discomfort or pain to a child, in order to correct his or her behavior" (Durrant & al., 2004).

These terms are used interchangeably in the literature, and can also refer to any situation in which the child is put in a physically uncomfortable position. Spanking and slapping, often considered gentle gestures, are examples of corporal punishment in use in our country.

1.3   Research objectives

In Burundian culture, there are several types of punishment administered to children, but in the case of our study, we will be talking about punishments known as corporal punishment, and its effects on child victims, as represented by the various actors in education.

Concretely, this study pursues the following objectives:
- To understand the logics that produce and maintain corporal punishment as an educational practice in Burundi.
- To understand the effects of corporal punishment on children, and the level of sensitivity of those involved.

2.   Materials and methods
2.1.   Study population

The people directly targeted by the research are those involved in education. They include parents, teachers and social workers. The sample of participants is not random. As our research is qualitative, it is not practical to establish a non-probabilistic sample. It seems appropriate to identify certain selection criteria so that the participants identified can provide data in line with the project's objectives. It also seems more realistic to envisage voluntary recruitment, so that participants are more inclined to share their opinions, conceptions and personal and professional experiences in relation to corporal punishment.

The data in this study was collected at three sites located in different environments. These sites are, respectively, the households of our respondents, the school environment where the teachers surveyed worked, and Sunshine Children's Center (CERES) located in the Buiza area, which temporarily houses street children waiting to be taken home. Our survey took place between November and December 2022, and the educational players who agreed to take part in these interviews numbered 50, including 36 women and 14 men. Our interviews lasted between 50 minutes and 1 hour. As the figure number 1 shows, women are more represented than men in our research work.
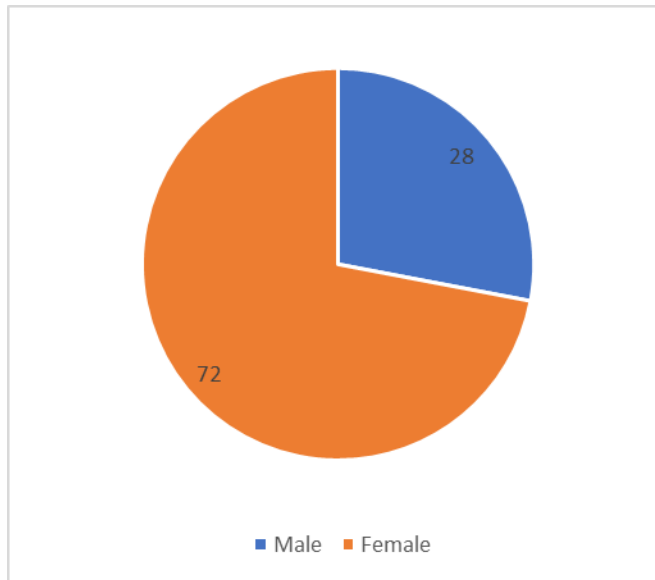
Graph 1. Distribution of respondent by sex

2.2. Sampling method

To select our respondents, we opted for the purposive sampling method (Thiétart et al, 1999). This method relies on the researcher's judgements to select sample elements. In fact, the latter authors state that the purposive sampling method performs just as well as the probabilistic method when the sample size is small. Thus, according to (Mayer & al., 2000), sources of information are chosen on the basis of their anticipated capacity to provide an interesting and relevant account of the object of study.

In practice, this method enabled us to select five people for the survey in the first instance. These respondents were then invited to recommend others for inclusion in our study, following the principle of snowball sampling.

Sample size takes into account the purpose of the study, the research and data analysis strategy, and the time and resources available(Mayer & al., 2000 b).

Given its qualitative nature, our research does not aim to constitute a statistical study with a representative sample of the target population. In fact, as this author confirms, the aim of sampling is to produce the maximum amount of information: it doesn't matter whether it's large or small, as long as it produces new facts"(Deslauriers, 1991, p.58).

Informed by this preliminary reflection, our sample size was determined according to the principle of saturation, which occurs when the addition of a source of information no longer

To take part in the study, the respondent should meet the criteria defined below according to the profile of the players.

For parents: have one dependent child, with 3 years' experience in parenting. For teachers: Be a teacher in a public or private school, with at least two years' seniority. For CERES social workers: Have been a social worker for more than two years, and have already worked with the families and loved ones of street children, who are often temporarily housed at the center. Demonstrate a willingness to participate in the study, and be prepared to tell us about the factors that produce and maintain the use of corporal punishment in their educational practices, and the effects it has on children. After several interviews, we realized that the content of the interviews was no longer adding any new insights to our study, and we decided to stop at a fixed number**.** A total of 50 respondents from different backgrounds, including 36 women and 14 men aged between 30 and 55, were selected as the sample for our study, and in-depth semi-structured interviews were conducted.

Parenting experience ranged from 5 to 20 years. These interviewees came from three different backgrounds: 48% were parents, 44% were teachers and 8 % were social workers at Sun Child Rehabilitation Center who temporarily house street children (victims of family abuse), before taking them home for social reintegration.

At each research site, we begin by taking our interviewees into our confidence, and asking them if we could talk to them, which they readily agreed to do. After explaining the aims of the survey, these respondents gave their verbal consent.

In order to conduct interviews with the first group of parents, we turned to a cell chief in the Kajiji district of the Kanyosha zone for information on families accused of abusing their children. This local administrator connected us with two women victims of gender-based violence, who often come to him to complain about the abuse they and their children have suffered at the hands of their husbands.

On the basis of these first two contacts, these two women helped us to find two other female parents, and the last two helped us to complete the list. So, in the parents' category, we contacted 24 (20 women and 4 man).

The second group of respondents was met at basic school of jabe and at basic school of Busoro.

In these schools, we first approached the heads of these schools, not only to grant us permission to carry out our research, but also to help us identify the teachers who could participate in our research according to the objective we were aiming for. Thus, in total, we interviewed 22 teachers, distributed as follows: 14 teachers (9 women and 5 man) at basic school of jabe, and 8 teachers (6 woman and 2 man) at basic school of Busoro. The third category of our respondents was contacted at the Sun Child Rehabilitation Center (CERES), and included 4 social workers (3 men and 1 woman). So, before the interview proper, we began with our presentation to put the study participants at ease, then the aim of our research, and finally, the rules of participation.

2.3.   Instruments for data collection

In order to better understand the logics that produce and maintain the use of corporal punishment in educational practices in Burundi, we used the life story as a data collection technique.

2.4   Analysis

Thematic analyses of the transcripts were carried out with the aim of highlighting themes arising from the opinions of the educational players.

The aim was to answer the following questions: What is fundamental in their words? What does the discourse of educational actors tell us about their reality, their lives and their experiences? (Goblet & Glowacz., 2021). The identification of themes broken down into sub-themes, and a focus on points of agreement, contradiction, agreement and disagreement, enabled us to access a delicate reflection on the phenomenon under study.

3.0.   Results and Discussion.

Analysis of the various accounts given by the education players reveals the following explanations: Social factors showing the basic upbringing of parents during their childhood: religious beliefs, the personality of the education actors, and finally the psychic tension linked to the general context, which motivates the use of corporal punishment.

As we can see from this graph, the majority of our respondents are in favor of the use of corporal punishment. The results in this graph show that 88% of those interviewed were in favor of the use of corporal punishment, compared with 12% who were against it (See Fig.2).
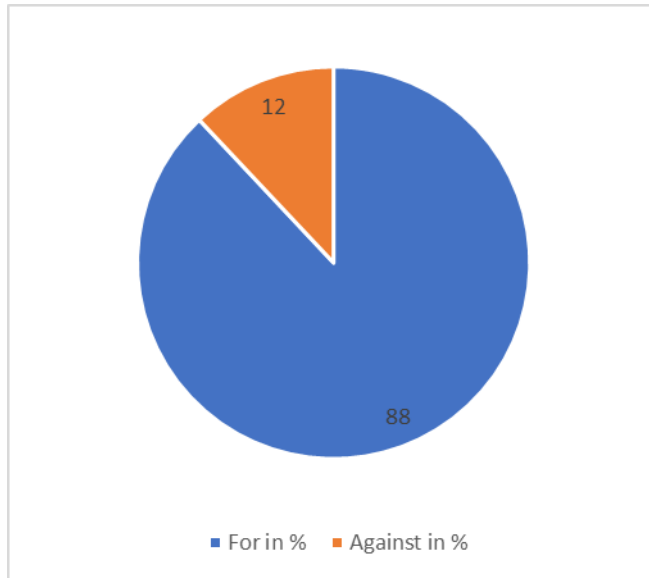
Fig.2. Proportion of our respondents expressed as a percentage of the use of corporal punishment

The results of our study are similar to those of previous authors, because with the demographic and legislative changes in societies since the 1970s, an ideal of egalitarian division of care and education tasks (Coulon & Cresson, 2007) followed. Nevertheless, the pace of realization of men's participation in childcare and education on the one hand, and the gender division of parental labor on the other, is slowly changing (Brugeilles & Sebille, 2009). In order to help explain why the ideal of egalitarian sharing does not materialize in practice, an analysis of the division of childcare and education tasks between parents was carried out. The results of this study show the complexity of conjugal alignments and discussions attached to organizational references, as well as the superimposition of cultural, social and economic factors. Parental involvement seems profoundly influenced by representations of their gendered roles and identities, which hinder the renewal of the sharing of parental tasks. The result is the production and reproduction of gendered socialization, a source of inequality (Brugeilles & Sebille, 2009 b).

3.1.   Educational violence and intergenerational transmission
The results of our research show that almost all our interviewees give socio-educational explanations as factors behind the use of corporal punishment to discipline their children (See Fig.2).
Let's consider how this respondent expresses himself:

"I think the factors may depend on how the parent themselves was educated during their early childhood. If the parent has been brought up to use violence since childhood, they too will certainly resort to these means, as they will not have experienced other positive models of upbringing of positive types''.

Nevertheless, if a parent has been able to endure these punishments and grow up according to the wishes of his caregivers, it is on the basis of the societal values of the time, more tolerant of child abuse, that he has been able to become resilient and get on with his life. We wonder about the reactions of the educated to the use of caning in the digital age and the age of children's rights, where today's children are faced with several channels of education from diverse, sometimes contradictory sources. We say to ourselves that today's children need censorship, on modes of punishment that can't harm their children.

3.2.   Effects of corporal punishment on children
Although the results of our research show that the negative effects of corporal punishment are minimal, almost all our respondents are against the excessive use of corporal punishment. Thus, 12% of our respondents consider that all corporal punishment can have negative effects, against 88% who see that there are no effects in the case of moderate punishment. However, when corporal punishment is abused, all the education professionals interviewed were unanimous (100%) in saying that the more excessive the punishment, the more the child is exposed to physical injury, ranging from the simple to the serious, to economic effects linked to long-term hospitalization, to psychological trauma and to the aggravation of certain maladaptive behaviours, up to and including delinquency.

3.3.   Psychological effects
Behavior modification
According to the parents we interviewed, punishment plays an important role in children's upbringing, as it encourages the child to immediately change behavior deemed inappropriate by adults.
Let's listen instead to this parent's account of his past, based on the upbringing he received as a child.

> "*I had a dad who very rarely punished us. Nevertheless, when we got into mischief, he couldn't refrain. One day, he punished me severely because I'd gone on an unauthorized outing. That day, I was in unusual physical and mental pain. And I remember that every time I got ready to commit other misdeeds, I*

immediately meditated on that previous punishment, and abandoned my faults." And besides, I only became a responsible man thanks to the strict education I received from my parents".

Similar studies have been examining the short- and long-term effects of corporal punishment on children's psychological development for many years. In a meta-analysis, it had been confirmed that one of the immediate effects of corporal punishment is the child's rapid obedience to what the parent wants (Gershoff, 2002). In fact, this is the primary aim of parents who use this type of educational practice. The child's immediate reaction is the result of a fear reaction and generates deleterious stress in the child. In the longer term, the results show a clear significant link between corporal punishment (frequency and intensity) and later disturbances in children's psychological development, including antisocial behaviors such as aggression, delinquency and other forms of maladaptive behavior of externalized types.

When it comes to the behavior of children with deviant behaviors living in the centers, adults intervene to separate children who are bickering.

Let's examine what this social worker has to say.

"In certain circumstances, we are obliged to resort to corporal punishment. For example, when we find a child in the center hurting another child. In this case, we act directly. It's a form of correction for the child perpetrator, but also a kind of appeasement for the child victim and other potential victims."

This punishment has a direct effect, such as stopping the fight immediately, but does not play a major role in the child's behavior.

On the other hand, the more the child has specific needs and is punished, the more his externalized behaviors are reinforced and become repetitive, extending his verbal and physical aggression towards adults, his violations of societal values and norms, and his path ends with an early entry into delinquency.

In analyzing the content of this testimony, we understand that the use of corporal punishment on children with special needs does nothing to help them. On the contrary, it risks entrenching them in their negative behavior.

Researchers have tested the use and frequency of spanking on externalized behaviors, and the results show that there is a difference between children who were not spanked and those who were spanked only with their hands and less than once a week, and those who were spanked more frequently and given an object. Children who had received severe spankings showed significantly more antisocial behavior than children in the other two groups (Lansford & al., 2012). Finally, there was no difference between children who

were never spanked, and those for whom this punishment was rare and given with the hand, suggesting that exceptional use of spanking has no significant effect on children's aggressive behavior (Baumrind & al., 2002). These results therefore underline the importance of distinguishing between the frequency and degree of severity of corporal punishment and spanking (Paolucci & Violato, 2004). In addition to these psychological consequences, there are physical effects that often require specific care.

3.4.   Physical and medical effects

In most cases, repetitive corporal punishment takes place in the context of maltreatment, where the perpetrators are no longer able to control the extent of its effects. In this way, we can find traces left on the body by intense, repetitive ill-treatment. Most often, on the bodies of child victims, we find indelible marks all over the body, with the parts most affected by these lesions being the face, the upper and lower limbs, and the posterior part of the trunk. Let's examine how our respondent testifies about the medical effects that lead to economic losses.

> "... Carried away by anger, my neighbor severely punished her child by pouring hot water on her legs. She accused her daughter of going on unauthorized outings. As a result, the child was hospitalized for 3 months at the Prince Regent Charles Hospital for treatment adapted to her injuries"

Every time I visited her, this mother was filled with feelings of regret and guilt, and admits that he won't be able to resume this form of punishment. Today, her daughter is cured, but she still has scars on her lower limbs and holds grudges against her mother".

Indeed, in her understanding, she wanted not only to punish the child, but also the leg that helps her walk.

By analyzing the content of this testimony, we wonder whether this mother wanted to punish the maladaptive behavior or simply wanted to stop it by burning the legs that help her walk.

If parents are very angry with their children when it comes to anti-social behavior, they do it out of love, not hatred, but they don't often measure the negative effects that can arise.

> Let's examine more from this parent:
> "I punish my children too. I try to use less forceful means, like my hands, slaps, and in case of excess, I also use canings and I whip them on the buttocks. It's not out of hatred that I hit them, but out of parental love, because I want them to grow up in the best ways".
> Generally, very short-tempered, he will use any object.

"One day, my husband punished our 7-year-old child. That day, he had taken his phone and broken it. My husband took the cable from our charger and used it to punish this child. That day, the charger left marks on his lower limbs. Today, all you have to do is show these children a charger to call them to order, and they immediately stop what they were doing".

The marks on the child-victim's body vary according to the objects used to punish. In the case of bound children, for example, the knots of the rope or the thorns of the stick are sometimes imprinted in the flesh. Tore ears, tore hair and crushed fingers are very common. Other types of injury can occur at the same time on various parts of the body, such as head wounds, fractures of all kinds and other forms of disability that often arise after the use of severe corporal punishment (Tardieu, 2008).

Depending on the physical and psychological trauma suffered, excessive corporal punishment can alter a child's initial body, and sometimes he or she can spend a lifetime suffering from the handicap associated with corporal punishment. In the case of cruel punishment (an unusual form of violence), the immediate and/or long-term death of victims is common, according to the findings of these authors (Tardieu, 2008 b).

Studies of over 4,000 European schoolchildren in six countries show that corporal punishment is associated with adverse effects on children's mental health, and that this association is stronger among children from countries that have adopted explicit policies banning the practice (Du Rivage & al., 2015).

These data are consistent with earlier US studies correlating corporal punishment with mental health problems, including earlier studies reporting an increase in aggression, and other externalizing problems (Mahomey & Donnelly, 2000, Frick & al., 1999) as well as an increase in childhood depression and anxiety and, later in life, a tendency to commit suicide (Wu, 2007 & Rodriguez, 2003). Finally, other research clearly shows that corporal punishment exposes children to negative risks, including increased mental health problems risk of negative consequences, including increased mental health problems (Gershoff, 2008).

3.5.   Corporal punishment in care centers
The family and school are not the only places where children can be subjected to physical violence. Children's centers, too, can use brutality and humiliation. In most cases, these children beaten in institutions have even less chance of being heard than in the family.

In addition to the school environment, where children can be physically brutalized, foster care centers, day-care centers, orphanages and the

Soleil child reintegration center for our study are no exception to this rule. In the above-mentioned centers, the perpetrators of physical aggression are not always adults, as current practice shows. In these centers, the adult often intervenes to separate the children in a fight or to inhibit the children's behavior, which is deemed antisocial and detrimental to the smooth running of the center.

Let's examine the testimonies of this social worker:

'*In certain circumstances, we have to resort to corporal punishment. So, when we find a child staying at the center hurting another child, we act directly. It's a form of correction for the child perpetrator, but also a kind of appeasement for the child victim, and other potential victims".*

This punishment has a direct effect on children's behavior, but doesn't play a major role in their behavior. On the other hand, the more the child has specific needs and is punished, the more his externalized behaviors are reinforced, and become repetitive. Generally, they extend verbal and physical aggression towards adults, violate societal values and norms, and end with early entry into delinquency.

By analyzing the content of this testimony, we understand that the use of corporal punishment with children with special needs does nothing to help them. On the contrary, it runs the risk of reinforcing their negative behavior. In other contexts, the school environment can be the scene of violence: it's no longer adults, but other children or gangs of children who terrorize, bully and tyrannize. Similar results have been found in previous studies carried out in Gabon, showing that the practices of childcare workers are marked by various forms of violence against children (physical, psychological, moral, and even sexual) (Quentin De Mongaryas & *al*., 2020). Moreover, in this country, the school climate "tends to decline and deteriorate more and more, because confronted with recurrent acts of violence (...) among others, brawls between pupils, aggression against teachers, violence by security forces against demonstrating pupils, etc." (Quentin De Mongaryas & Bibalou, 2021).

Authors inspired by the national observatory study, specify that child abuse is also a social scourge (Demba, 2012 & Matari, 2014). Indeed, the results of the study carried out by the national observatory for children's rights show that 77.7% of Gabonese children were victims of violence. According to these studies, this violence is progressive, starting in the family, then in the community and finally at school. In addition to ritual crimes against children, physical, psychological, moral and sometimes sexual violence are the most common forms. The effects of corporal punishment on children are not always confined to the family and/or the institution. As we shall see, it also has negative implications for school children's learning.

3.6.   School failure as a result of corporal punishment

Although the use of corporal punishment in schools is increasingly prohibited by law, its use continues to be heard and recorded in cases of serious injury, and in some circumstances, students die from the pain of caning.

Let's examine the testimony of this teacher:

"There are teachers who still use sticks to punish. But this has consequences for the child's learning, as he or she develops a great fear, and immediately loses motivation. And when the child loses interest in school, academic and often repetitive failure ensues. "

Although this teacher doesn't expressly admit to using corporal punishment as a means of punishment, he does testify that there are teachers who manage to seriously hurt children.

Let's examine what he has to say:

"I'm the teacher in charge, and I frequently receive complaints from parents who come to see me to mediate between the conflict between pupil and teacher on the one hand, and parent and child on the other, as the latter wants to change schools because of this open conflict between teacher and pupil". Some cases succeed in restoring trust, while others fail. In some cases, complaints can lead to the teacher being prosecuted for assault and battery, as this is an offence under the Burundian penal code."

When children come into conflict with their teachers over punishments deemed unjust, this has harmful effects on the quality of relationships and learning, as this teacher testifies:

In my experience, students who are frequently punished by teachers rarely succeed. When punished students perceive that these punishments are unfair, some of them don't even wait until the end of the school year. Those who persevere play truant and participate only moderately in the regular assessments organized by the class".

The results of our study are similar to those of previous authors who have studied this subject in schools. Focusing on the problem of the use of humiliating punishment, and its repercussions on academic success, this shows a negative side to the relationship between teachers and pupils (Demba, 2012). This view is close to that of another, insofar as understanding the phenomenon of school failure is inseparable from pupils' relationships to school knowledge (Merle, 2002). The latter is an extension of a lack of positive

communication between teachers and students, a form of expression of a denial of the latter's rights in Gabon (Demba, 2012). He agrees with other authors that a school that beats and humiliates failing pupils is certainly not a just school (Demba, 2012). In the same logic, another study provides guidance by returning to professional ethics and deontology, and finally insists on teachers' duties towards the child, considered as a deposit entrusted to them by society (Tsafack, 2018).

Conclusion and recommendation

We have now achieved our research objective. The results show that the factors that lead Burundian education professionals to resort to corporal punishment are rooted in traditional practices and religious beliefs. Parents who were punished as children don't understand why they can't correct their children, even though biblical scripture recommends doing so. Corporal punishment is forbidden in schools, but still authorized in families. Such a formulation opens up margins of maneuver for those involved in education, which everyone uses as they see fit, with the aim of escaping the use of corporal punishment, informally forbidden to teachers. This shows that there is still a long way to go, as school regulations on sanctions remain ambivalent. A pupil who is not punished at school by his teacher will not escape punishment at home, or a parent may use corporal punishment to punish his own child at school.

In addition to its impact on many areas of children's lives, this form of violence is passed down from generation to generation. There is a link between the traces of severe physical violence experienced by educators and its justification in reproduction. To reduce the cycle of intergenerational transmission, prevention programs are needed. We believe that the various players in education need awareness-raising sessions on the effects of corporal punishment, the merits of not using corporal punishment, and the mechanisms of positive parenting as an alternative to violence. The community and other education professionals should benefit from ongoing parenting courses, and other initiatives to combat domestic violence and manage conflict.

In addition, policy-makers should set up improved services for child victims, and develop policies and legislation to protect children. Despite the identification of the factors that lead educational actors to use corporal punishment to educate, the issue of respect for children's dignity and rights remains problematic in our country. However, the lessons drawn from our research can serve as a basis for future researchers wishing to undertake studies in this field.

Recommandations

As national legislation does not formally prohibit the use of corporal punishment (End Violence Against Children, 2018), our study suggests that

- The Burundian government to take measures to ban corporal punishment in schools and at home.
- Ensure that all schools have clear policies to prevent violence,
- Introduce confidential reporting and complaint procedures that will serve as a database, and thus organize interventions that take into account the real needs of child victims.

Finally, effective multi-sectoral collaboration to end violence against children is essential, and must involve both governmental and non-governmental players. Each sector must have clear responsibilities, with coordination overseeing the articulation of different actions (World Health Organization, 2020).

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This research complied with ethical principles concerning studies involving human subjects. Before starting, we requested authorization from University of Burundi Research and Innovation Department. This institution issued us with a research certificate and closely monitored the entire process, right up to the validation of its conclusions. **This study has been approved by** University of Burundi Research and Innovation Department and the principles of the Helsinki Declaration were followed.

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Executing Quality Management Tools to Enhance Customer's Journey at a Clothes Laundry Firm

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Abstract

Purpose: This paper focuses on assessing and enhancing the customer's journey at a laundry company in Saudi Arabia. This begins from the moment the customer arrives at the car park, including the process of receiving the services and subsequently making payment. Design, Methodology, Approach: A mixed-method approach was employed and qualitative data were gathered from focus group interviews and individual interviews. Quantitative data were gathered via the survey. Quality Management Tools were used to develop the action plan and offer conclusions and recommendations that would enhance the customer's journey and improve satisfaction. Findings: Issues relating to service quality are categorized into five types: promotions, human resources, services, detergent products, and facilities. House of Quality represents the highest 15 prioritized solutions. These recommended solutions' relative weights range between 4 to 9%. The use of these tools highlights areas for improvement and the root causes of each issue. The voice of the customer and the voice of the employees are key sources to obtain valuable input. This research proffers step-by-step practical guideline for service organizations on how they can apply the quality management tools in their business, which will help them identify issues and

continue improving. Its implications to academia merge the ServQual theory and QM in customer services and satisfactions. Originality/Value: This study will add value to the literature since there are limited studies employing the seven Quality Management Tools to enhance customer satisfaction and improve their journey. The Saudi laundry market specifically has a dearth of this type of study. The leadership of an organisation in the laundry sector is established through the implementation of tailored quality solutions, the prioritisation of customer satisfaction, and the enhancement of operational efficiency.

Keywords: Quality Management Tools, Customer Journey, Clothes Laundry Stores, ServQual, Customer Satisfaction, Customer Experience

Introduction

The laundry sector in Saudi Arabia has experienced significant growth due to demographic changes and the increasing demand for dry cleaning, clothes washing, and laundry services. The working female population in Saudi Arabia is expected to continue growing, thus leading to an increase in spending on clothes and cleaning services. The laundry industry has evolved into an indispensable service, with annual revenue yields estimated at $60.88 billion. The industry's growth is attributed to various sector services, including industrial sectors, as well as social factors such as the increasing number of single-person households and the rapid pace of urbanization.

Globally, the laundry and service industry are estimated to reach $75.1 billion by 2025, with a CAGR of 4.2%. The leading laundry brand in Saudi Arabia, with over 25 branches in one city, has been operating in this industry since 1982. The subsidiary company started a new model in 2017 with 10 branches in one city. The company plans to expand to other regions and cities and achieve 20 branches by 2025.

Service quality in laundry-care settings is closely linked to customer satisfaction, and businesses can improve service quality to differentiate their offerings and ensure customer satisfaction. High service quality also leads to increased customer loyalty. This is because high service quality generates high customer satisfaction, ultimately leading to customer loyalty.

As the Saudi laundry market faces increased competition, optimizing operational processes is crucial for providing value to customers and meeting consumer expectations. Observing service quality is a critical aspect of service business. It helps identify and close the gap between customers' normative service expectations and their views of service performance. The ServsQual dimensions, consisting of five specific attributes, are an effective tool for measuring service quality.

Reliability is a crucial aspect of service quality, and it evaluates a firm's ability to deliver a promised service accurately and dependably. It refers to a firm's commitment to providing timely and appropriate support to customers, thus ensuring punctuality and commitment. Tangibles, on the other hand, refer to a firm's physical facilities and appearance, which influences its brand image and customer perception. These dimensions include equipment, staff attire, and visual appeal.

Assurance is the staff's knowledge, skills, courtesy, and ability to instill trust and confidence among customers. It involves informing customers and listening to them, regardless of factors such as age, nationality, and educational level. Empathy is the resulting respect and friendliness from personal contact with customers. This requires service providers to establish policies and procedures to strengthen relationships with clients, staff, and other interpersonal relationships. It focuses on offering care or personalized attention to clients, thus demonstrating approachability, sensitivity, and efforts to understand customer needs.

Satisfaction is the state of a process end in which customers subjectively evaluate the perceived benefits drawn from a service. It refers to the cognitive assessment of the extent to which the service delivers, and the level of fulfillment gained from the consumption of a specific service. This research aims to maximize understanding of customers' needs and wants by listening to them and improving the customer journey from the moment they arrive until they obtain what they need. To achieve this objective, the researchers used a mixed-methods approach, including qualitative data collection through focus group interviews and quantitative data collection through surveys. They further employed Quality Management Tools to generate an action plan and formulate decisions and recommendations so as to develop the customer journey and increase satisfaction.

Focus Groups

Concerning the focus groups, the authors organised a virtual meeting with three customers and three representatives from the organisations. The focus group lasted for approximately 60 minutes. The main topic of discussion was the customer expectations regarding the laundry service, which would lead to their satisfaction while covering areas such as promotions, human resources, services, detergent products, and facilities inside the stores.

Survey
Designing the Survey

The study utilized SERVQUAL dimensions, which was adapted from the work of Parasuraman et al. It was expanded based on data from focus group sessions. The questionnaire was translated into Arabic and sent to academic

colleagues and professionals to assess content and face validity. Subsequently, the questionnaire was forwarded to the project director for feedback, comments, and modification before being disseminated. A pilot test was conducted to assess the questionnaire's reliability and validity. Cronbach's alpha was used to analyze reliability, with values above 0.70 being crucial.

The correlation method was also employed to investigate the validity of the questionnaire. One item was deleted for the empathy dimension due to a non-significant correlation, thus reducing Cronbach's alpha from 0.923 to 0.836 (Table 1). Three items were removed from the additional services dimension due to their insignificant correlations. The mean and standard deviation for each item in the survey indicate that customers are relatively satisfied with the current service quality.

Table 1. Measuring the Reliability and Validity of the Questionnaire

Main Factor	Code	Dimension/Question Area	Cronbach's Alpha	Total Correlation
Tangibles	TA1	The company has up-to-date equipment in the branch that I recently visited.	0.873	0.601**
	TA2	In general, the physical facilities in the branch that I recently visited are visually appealing.		0.574**
	TA3	Employees were well-dressed/neat in the branch that I recently visited.		0.642**
	TA4	The facility that I recently visited has a wait ing area.		0.650**
	TA5	The waiting time is appropriate and reasonable at the facility that I recently visited.		0.772**
	TA6	There is an adequate and suitable parking space at the facility that I recently visited.		0.559**
	TA7	The air conditioning inside the facility that I recently visited is appropriate and convenient.		0.409*
	TA8	The facility that I recently visited smelled appealing.		0.746**
	TA9	There is appropriate and convenient packaging for clothes when received.		0.832**
Reliability	RE1	The company responds to the customers within the promised time frames.	0.951	0.820**
	RE2	The company is dependable for cleaning services.		0.902**
	RE3	The company is dependable for ironing services.		.905**
	RE4	The company provides cleaning services within the agreed times of service.		0.875**
	RE5	The company provides ironing services within the agreed times of service.		0.901**

Main Factor	Code	Dimension/Question Area	Cronbach's Alpha	Total Correlation
	RE6	The company keeps accurate records about the customer's invoices.		0.846**
	RE7	The services provided on my last visit suited my expectations and needs as a customer.		0.724**
	RE8	Every time that I visit the company's facilities, I receive the same quality service.		0.588**
	RE9	The company provides a special service of washing each customer's clothing separately.		0.808**
Responsiveness	RS1	The company informs customers exactly when the service will be performed.	0.942	0.859**
	RS2	Employees are always ready and willing to help customers.		0.799**
	RS3	Employees welcome and respond to special requirements from the client such as increasing starch folding or hanging clothes.		0.865**
	RS4	Employees respond quickly if something goes wrong to solve the problem, such as missing clothes or wrong pricing for a service provided.		0.882**
Assurance	AS1	The employees are trustworthy.	0.943	0.902**
	AS2	Customers feel safe when dealing with employees.		0.905**
	AS3	The employees are polite.		0.875**
	AS4	Employees respond to customer inquiries with a clear answer.		0.867**
	AS5	Employees advise choosing the appropriate service according to my needs		0.789**
Empathy	EM1	The company gives individualized attention to each customer.	0.923	0.745**
	EM2	The employees give individualized attention to each customer.		0.819**
	EM3	Employees prioritize the needs of the customers.		0.754**
	EM4	The company operates at hours convenient to the customer.		0.819**
	EM5	Employees fully understand the needs of the customer.		0.820**
Additional services	AD1	I wish that the company provided pick up and home delivery.	0.902	0.735**
	AD5	I wish that the company provided cleaning products available for purchase.		0.829**
Satisfaction	SA1	The provided service of laundry and ironing are excellent and professional.	0.953	0.820**
	SA2	I consider this service my first choice.		0.754**

Main Factor	Code	Dimension/Question Area	Cronbach's Alpha	Total Correlation
	SA3	My overall experience with the provided service satisfies me.		0.819**
	SA4	I recommend this service to people who seek my advice.		0.820**
	SA5	The price of the ironing service is appropriate and suitable for the quality of the service provided.		0.902**
	SA6	The price of the laundry service is appropriate and suitable for the quality of the service provided.		0.905**
	SA7	I am completely satisfied with the company's complaints system.		0.875**
	SA8	I am completely satisfied with the compensation system in the event of loss or damage to clothes.		0.901**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Distributing the Survey

The study population comprised of customers who use dry cleaning services. The survey was distributed electronically via the online link and a printed QR code was pasted in all the laundry's branches. The survey used simple random sampling, thus giving each customer the same opportunity to participate in the questionnaire (Fleiss et al., 2013). A total of 131 complete responses were received and used in the subsequent stages.

Customer Journey Map

The Customer Journey Map is a technique for tracking and analysing the customer experience and evaluating the quality of a service or process. The Customer Journey Map is a time-based, linear representation of the main stages that a customer encounters when interacting with a company or service (Mangiaracina & Brugnoli, 1970). Customer experience is primarily a process that starts with a beginning entry point and progresses to an endpoint based on users' intentions, motivations, and goals. This experience flow is separated into key stages using Customer Journey Mapping. Commencing with an analysis of the user's behaviour, specific goals, intentions, touchpoints, tools, and issues are identified in each stage. Furthermore, the emphasis shifts to the connections and dynamics that exist within stages (Mangiaracina & Brugnoli, 1970).

The customer experience, in relation to laundry, is structured into five key stages: visiting the site, the catalogue of services the customer can choose, browsing and/or requesting, receipt of service selection, and the final checkout process with payment (Figure 1).

Customer Journey Map						
Stage		Visiting	Requesting	Serving	Receiving	Payment
Responsibility Department	Customer Services					
	HR					
	Operational Service					
	Stock					
	Sales					
	Accounting					
	Top Management					
Customer Feeling		🙂	😀	🙂	😀	🙂
Overall Rating		3.95	4.03	3.95	4.03	3.97

Figure 1. Customer Journey Map.
Developed by the authors.

Quality Management Tools

Affinity Diagram

The affinity diagram is a quality management and planning tool. It is useful in capturing, collecting, categorising, classifying, and grouping ideas into commonly shared concepts (Widjaja & Takahshi, 2016; Awasthi & Chauhan, 2012; Cheng, 2014). This is in addition to brainstorming language phrases. This tool further helps to understand, organise, and recognise trends so as to avoid duplicates. The information categorised in the affinity diagram is a starting point for analysis and inputs with other tools (Carnevalli & Miguel, 2008). From the focus group, the outcomes of interviews and responses to the questionnaire were separated into five groups (Figure 2).

Price and Promotion
- Suitable prices
- Need to have promotions.
- Subscriptions and memberships
- Loyalty program
- Continues promotions and offers.
- Some customers are unaware of promotions
- Corporate rates and discounts

Human Resources
- Receptionist issues (serious, firm, guest does not feel welcomed)
- Greater focus required.
- Carelessness (training and supervising)
- Training for frontline
- Lack of use of mobile service
- Personnel hygiene
- Language barrier

Detergent Products
- Labeled and branded products
- Branded and labeled clothes spray.
- Branded and labeled stain remover.

Inside the Stores
- Posters' awareness of used products and origins
- Wide screen to show the process of cleaning and ironing.
- Awareness videos
- Information shown in front of the gate.

Services (1)
- Distinguished services
- Need to continuously develop
- Advanced services (self-services, delivery)
- Issues with the ironing of cotton clothes
- Operating time, e.g., 7 am - 12 am
- High level of trust in service

Services (2)
- Self-service
- Delivery application
- Dressing room
- Drive-thru
- Free delivery
- SMS to the client once clothes are ready for collection
- Arrange and fold clothes inside travel bag (extra fee)
- Self-service before and after service to drop and receive

Figure 2. Affinity Diagram for Quality of Services Issues (Developed by the Authors)

Interrelationship Diagram

The relationship diagram, also known as an interrelationship diagram or network diagram, portrays the cause-and-effect relationships that exist between issues. This quality management tool assists the business to understand relationships among different aspects of a complex group of factors that influence problem solving (Marinescu et al., 2010). It begins by drawing the relational connections that appear in the affinity diagram, which requires a highly creative process. The following relationships are obtained from the logical relationship between groups in this study (Figure 3).
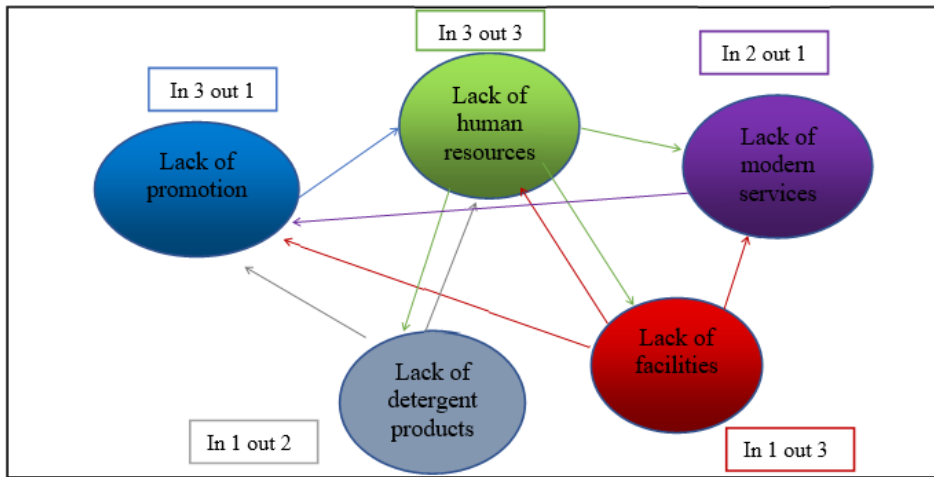
Figure 3. Interrelationship Diagram (Developed by Authors)

Tree Diagram

The Tree Diagram, also known as tree analysis, an analytical tree, or a hierarchy diagram, is just one type of mind map (Jones et al., 2001). While a mind map has a central idea surrounded by branches of related ideas, a Tree Diagram has a drawing that is like a tree. This method is exploited to find increasingly greater levels of detail in a complex problem and is beneficial in progressing from generalities to specifics in small steps. The method begins with a single node and branches out to other nodes that represent mutually exclusive decisions or events (Wat et al., 2020).

A Tree Diagram is applied when thoroughly evaluating complex processes to achieve specific objectives in a short period of time. It is also utilised when an organisation must investigate whether the root cause produces a specific effect, i.e., the problem to be solved. Furthermore, it considers the advantages and disadvantages of various potential solutions in successfully implementing them (Marinescu et al., 2010). The Tree Diagram is a unique approach for grouping and clearly documenting ideas (Jones et al., 2001; Marinescu et al., 2010). This diagram begins with its "root," which is the principal or key idea and is subsequently followed by related and derived ideas (supplementary 2)

Process Decision Program Chart (PDPC)

The process decision program chart (PDPC) is a new management planning tool that systematically identifies what might not be successful in a plan under development. Countermeasures are developed to prevent or offset those problems. The PDPC involves revising the plan to avoid problems or it is prepared with the most effective response when a challenge occurs

(Popescue & Gîrboveanu, 2017). The PDPC is a new management planning tool that systematically identifies what may not succeed in a plan being developed. Attempts are made to minimise or mitigate these issues.

It is worth noting that preventing issues is more straightforward using the PDPC than tackling them after they have already occurred. There are two primary reasons for PDPCs, namely documenting the steps necessary to complete a process and conducting an effective analysis (Popescue & Gîrboveanu, 2017). A rigorous investigation of the process and what might not be successful is the objective of the PDPC.

This project management tool is valuable in the Improve phase of the DMAIC prior to executing a plan. It is beneficial in the analysis following the process mapping to confirm the understanding of the status (Levesque & Walker, 2007). The PDPC, as a six-sigma tool, is not employed in every project because they may not be necessary and require time and work to implement. However, the PDPC is recommended when a new procedure is initiated. The PDPC is also essential when a vast complex project is being undertaken (Mizuno & Bodek, 2020).

The PDPC further provides solutions to the issues listed in the tree diagram. The solutions are illustrated in the green boxes, whereas the potential drawbacks are shown in yellow. In addition, another green box reveals the solution to the drawback (supplementary 3).

Matrix Diagram

The Matrix Diagram is defined as a new management planning tool used to analyse and display the relationships among data sets. The Matrix Diagram presents the relationship between two, three or four groups of information (ASQ.org). The connection between two, three or four categories of information is explained by the Matrix Diagram (Madigan, 1993). This diagram may also provide information on the relationship between distinct people or metrics, such as the strength of the link. It is possible to create six different-shaped matrices, such as L, T, Y, X, C and roof-shaped. Nevertheless, this depends on how many groups must be compared. The T-shaped matrix diagram was employed in this research (Alwan, 2011). This diagram outlines all the aspects of the PDPC diagram and rates them in terms of value and relationship for each of the initiatives. Accordingly, they are rated based on strong, medium, weak or no relationship, thus allowing the authors to determine which solution are important (Table 2 and supplementary 4).

Table 2. Matrix Diagram Symbol Value

Symbol	●	○	▼	
Value	9	3	1	
Relationship	Strong	Medium	Weak	No relationship

Prioritization Matrix

The Prioritization Matrix is a useful technique for identifying problems that are most important to resolve first. The use of appropriate tools is critical to project success. Gantt and Burndown charts for project management, team communication, and project scheduling are examples of what can be achieved using project management software. When used in conjunction with specified criteria, this matrix is recognised as a Criterion or Priority Matrix. This business analysis tool enables people and project teams to objectively assess possibilities. This allows them to identify the following aspects: Which initiatives are of the utmost importance? Which of these provides the greatest value to the firm? Which has the greatest chance of success?

The Prioritization Matrix can be used by anybody, from individuals to large organisations, for any sort of work or project, regardless of its complexity. When utilised effectively, this approach is a reliable conflict management and resolution strategy that also serves as a more efficient means of choosing projects (Tovar-Perilla et al., 2018). Furthermore, the tables are divided into technical requirements which are listed vertically, along with the importance score and ranking. The overall importance score is at the bottom, which indicates tasks that need to be prioritised for each department or team to work on.

The strategies or technical requirements were prioritised in terms of the score and were assigned to each department based on the action plan listed in the final column (supplementary 5)

Quality Function Deployment

Quality Function Deployment (QFD) is a Total Quality Management (TQM) tool used to meet customers' needs and expectations systematically. According to Kiran (2017), QFD is a structured approach that defines customer needs and expectations and applies them to establish plans and create products and services that meet these expectations. This approach involves capturing customer needs and requirements using surveys, observation or field reports. Subsequently, the information is summarized as a product planning matrix and is used to translate product requirements and characteristics to satisfy customer needs (Kiran, 2017).

The most significant use of the QFD process in improving the quality of work is translating customer needs and expectations into product and

service specifications (Kiran, 2017). The researchers employed the House of Quality (HOQ), which is the main tool used in QFD. Firstly, the voice of the customer was divided into five categories obtained from the Affinity Diagram with certain adjustments (promotions, human resources, services, detergent products, and facilities). Below these categories, there was a list of 15 requirements collected from customer statements.

The importance of each requirement was identified from 1 to 5. In addition, technical requirements were imported from the PDPC, with a total of 68 solutions. These were reduced to 15 requirements that hold the highest scores. The relationship aspect was brought in from the prioritization matrix tool. The score of each technical requirement was then calculated. The highest score was 260 for self-service machines involving drop-off and pick-up. On the other hand, the lowest score was 5 for partner services such as Uber and Careem, which provide delivery service (supplementary 6 a- b).

The competitive evaluation involved the company under study and two other companies that focus on the same client segments. The company and competitors' services were assessed against customer requirements prior to employing the improvements. The scale for this test was from 0 to 5. The roof was used to identify where technical requirements support (+) or impede (-) one another in the implementation. To summarise, the HOQ utilised management tools to develop and offer the most appropriate solutions for customer needs and to compete with the rivals in the market (Figure 4).
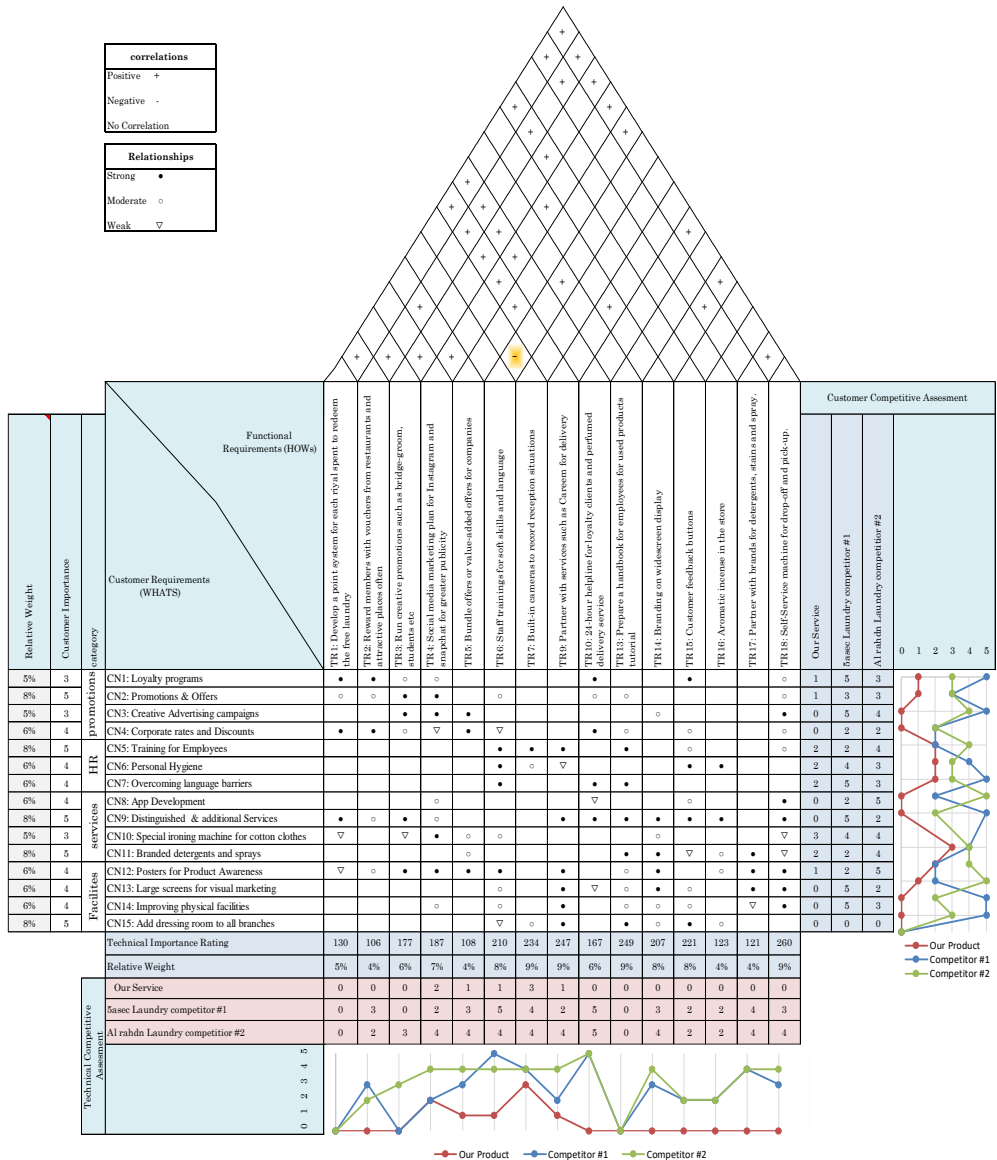
correlations

Positive	+
Negative	-
No Correlation	

Relationships

Strong	●
Moderate	○
Weak	▽

Functional Requirements (HOWs):

- TR1: Develop a point system for each riyal spent to redeem the free laundry
- TR2: Reward members with vouchers from restaurants and attractive places often
- TR3: Run creative promotions such as bridge-groom, students etc
- TR4: Social media marketing plan for Instagram and snapchat for greater publicity
- TR5: Bundle offers or value-added offers for companies
- TR6: Staff trainings for soft skills and language
- TR7: Built-in cameras to record reception situations
- TR8: Partner with services such as Careem for delivery
- TR9: 24-hour helpline for loyalty clients and perfumed delivery service
- TR10: Prepare a handbook for employees for used products tutorial
- TR11: Branding on widescreen display
- TR12: Customer feedback buttons
- TR13: Aromatic incense in the store
- TR14: Partner with brands for detergents, stains and spray
- TR15: Self-Service machine for drop-off and pick-up

Relative Weight	Customer Importance	category	Customer Requirements (WHATS)	Technical Importance Rating	Our Service	5asec Laundry competitor #1	Al rahdn Laundry competitor #2
5%	3	promotions	CN1: Loyalty programs		1	5	3
8%	5	promotions	CN2: Promotions & Offers		1	3	3
5%	3	promotions	CN3: Creative Advertising campaigns		0	5	4
6%	4	promotions	CN4: Corporate rates and Discounts		0	2	2
8%	5	HR	CN5: Training for Employees		2	2	4
6%	4	HR	CN6: Personal Hygiene		2	4	3
6%	4	HR	CN7: Overcoming language barriers		2	5	3
6%	4	services	CN8: App Development		0	2	5
8%	5	services	CN9: Distinguished & additional Services		0	5	2
5%	3	services	CN10: Special ironing machine for cotton clothes		3	4	4
8%	5	services	CN11: Branded detergents and sprays		2	4	4
6%	4	Facilites	CN12: Posters for Product Awareness		1	2	5
6%	4	Facilites	CN13: Large screens for visual marketing		0	5	2
6%	4	Facilites	CN14: Improving physical facilities		0	5	3
8%	5	Facilites	CN15: Add dressing room to all branches		0	0	0

Technical Importance Rating: 130, 106, 177, 187, 108, 210, 234, 247, 167, 249, 207, 221, 123, 121, 260

Relative Weight: 5%, 4%, 6%, 7%, 4%, 8%, 9%, 9%, 6%, 9%, 8%, 8%, 4%, 4%, 9%

Technical Competitive Assessment:

Our Service	0	0	0	2	1	1	3	1	0	0	0	0	0	0	0
5asec Laundry competitor #1	0	3	0	2	3	5	4	2	5	0	3	2	2	4	3
Al rahdn Laundry competitior #2	0	2	3	4	4	4	4	4	5	0	4	2	2	4	4

Figure 4. The House of Quality (HOQ)

Areas for Improvement

Promotions and Communications

Several views were expressed surrounding promotions. While specific customers requested having promotions, others were not aware that there were promotions. Therefore, it appears that there is a communication gap that requires further improvement and development. The following recommendations have been made:

- Use different communication channels, such as SMS, WhatsApp, and social media.
- Use printouts and flyers and hang them on the clothes.
- Promotional messages at the end of invoices.
- Using screens inside the stores that not only show promotions, but also inform and make customers aware of the entire process to create trust in the service, hygiene, process, care, etc.

Subscriptions, Memberships, and Loyalty Programmes

The laundry service provider does not have any subscriptions, memberships, or loyalty programmes. Customers are however expected to receive this service. Frequent customers mentioned that, on several occasions (i.e., questionnaires and customers focus group), they expected to have a membership card or loyalty programme where they could be given discounted prices or a points system that could be claimed as free services. Nonetheless, there are some concerns with the implementation of this type of service:

- Systems should be able to track memberships, points programmes, etc.
- Clear programme terms and conditions with a transparent policy.
- Eligible customer and enrolment procedures.
- Table of benefits and advantages.

Staff Issues

The results of the questionnaires highlight irresponsible and impolite staff who use their phone when customers are present. Customers complained that they did not feel welcomed. Additionally, language may be a barrier between staff and customers whose first language is not Arabic. Thus, to assist with understanding interactions, staff should use simple language without any jargon**.** The following are suggestions to improve the service and develop a customer-oriented attitude:

- Orientation and awareness sessions should be held frequently to create a customer-oriented approach.
- Develop steps for serving customers in the service industry. This can begin with smiling and receiving their clothes. Typically, four to six steps are employed.
- Ensure that the approach is sustainably applied by using the secret customer/shopper approach and direct feedback from customers, alongside frequent visits from branch managers and supervisors.

Services

The results confirm a high level of trust in the services provided, which could be a strong competitive advantage that may be built upon and sustained.

Customers are satisfied with regular and traditional services but requested more up-to-date services:

- A greater focus on cotton clothes in the ironing services.
- Drive-through services that would allow customers to access services from their vehicles.
- Customers desire convenient drop-off and pickup of cleaned and ironed clothes, potentially requiring investment in technology and setup for efficient service.
- Customers requested access to clothes machines for self-cleaning services, ensuring privacy and ensuring clothes are cleaned alone without mixing with others' belongings.
- Customers requested having an extra service to wash each customer's clothes separately.
- Customers repeatedly requested delivery services and an APS software application, which could be essential if designed with cost and logistics in mind.
- Some customers receive their clothes and want to wear them immediately. Hence, they suggested having dressing rooms available.
- Customers wanted to be able to take their clothes to be cleaned, give staff a travel bag and subsequently receive the clothes folded inside the bag.
- A few customers suggested extending the service hours and opening early, i.e., 7 am rather than the current open timing of 9 am.

Detergent Products

Customers have a high level of trust in the services and repeatedly ask if detergent products are available for sale. This area is a new line to diversify the business and potentially reach a new segment of customers who request the following:

- Clothes spray
- Stain remover and freshness
- Detergent products
- Air spray

Discussion

This study set out to assess the importance of enhancing the customer's journey at a laundry company in Saudi Arabia. This begins from when the customer arrives at the laundry store's car park until they are served and pay for the service they have received. This study used the ServQual dimensions (Parasuraman et al., 1988), which is an effective concept used to measure the service quality of Clothes Laundry Services. The survey strategy, focus group

interviews, and questionnaires were utilised to collect data and gain understanding of the services, customers' expectations, needs, and areas for improvement. Seven quality management tools, including the Customer Journey Map, Affinity Diagram, Interrelation Diagram, Tree Diagram, the PDPC, matrix diagram, and QFD were applied in this study to analyse, organise, classify, and categorise collected data, understand relationships, and examine the cause-effect among dimensions.

The Customer Journey Map was used to measure and analyse the customer experience and evaluate the quality of a service or process provided by the firm. The score determined the level of customer satisfaction with specific objectives and intentions, with the touch points in the business. These results suggest that customer satisfaction can add value to the firm and facilitate meeting customer expectations. As a result, the study investigates the effect of SQ on customer satisfaction and develops the SERVQUAL model to investigate the effects of the five dimensions. These results are consistent with the case study conducted by Micheaux and Bosio (2019), which describes how service design methods were used in the development of a course on data-driven marketing. Customer journey mapping, employed as a visual representation of individual interactions with a product, service or brand, explains how an interaction occurs in one moment and how it influences all other moments. Students benefit from a more innovative and creative approach to data-driven marketing by viewing the customer journey from the "data as a service" perspective, which helps improve their attention and motivation.

The Affinity Diagram was used to classify the data extracted and collected from questionnaires, focus groups with employees and customers, and interviews. The finding highlighted service quality issues, which are categorised into five: promotions, human resources, services, detergent products, and facilities. These results are consistent with the study of Lucero (2015). Accordingly, an unstructured qualitative data can be understood through an affinity diagram, which is an appropriate technique for collaborative analysis. Using an affinity diagram in the evaluation process assists with creating and clustering the notes to form a better understanding of the context and subsequently adopting it in practice.

The Interrelationship Diagram supports the firm to understand the relationships among different aspects of a complex group of factors that influence problem solving. These results are consistent with the study undertaken by Kwiecińska (2015), which suggests that the relations diagram not only identifies the association between cause and effect, but also between two or more causes. The elements of the diagram, with the most direct connections, are the starting points for the analysis of further ship safety. In addition, it was used to plan corrective measures and actions that directly

improve shipping safety at sea. Identifying the various causes of fires allows their frequency to be eliminated or reduced in the future.

The Tree Diagram for this project was presented in a series and developed until the desired level of detail was attained. The solutions have been investigated in details. These results are consistent with the study completed by Tanimoto (2008), which investigates a set of issues concerning coordination in collaborative problem solving and design. The study presented a variety of interactive features relating to state-space search trees designed to facilitate such activity. To provide possible solutions to the issue posed in the Tree Diagram, the PDPC was employed to systematically identify what might not work effectively in plans under development.

A set of issues related to coordination in collaborative problem solving and design are explored. Thus, a variety of interactive features for state-space search trees intended to facilitate such activity is presented.

The Matrix Diagram was applied to outline all the aspects of the PDPC diagram. It was rated in terms of value and relationship for each of the initiatives based on their strong, medium, weak, or no relationship. The study conducted by Pramono et al. (2018) highlighted that many organisations face challenges in implementing effective quality management tools and techniques. This is due to common difficulties such as inadequate training and support, inappropriate tool and technique use, along with poor measurement and data handling. The seven tools are utilised to identify and recognise the factors that may cause the product to fail. Furthermore, a quality improvement design is proposed to reduce the number of product defects.

Finally, QFD was applied to establish plans to produce service that meets customers' expectations, thus implementing their technical requirements to responsible relevant departmental roles. House of Quality represents the highest 15 prioritised solutions. These recommended solutions' relative weights range between 4 to 9%. The use of these tools highlights areas for improvement and the root causes of each issue. The present findings appear consistent with research undertaken by Alajhar et al. (2022) and Pramono et al. (2018). It was established that many fields could implement the seven quality management tools for problem solving, reducing product defects, and improving development in many areas.

Action Plan

Action	Priority	Responsible	Resources	Obstacles
Introduce the plan to all members of the organization	1	Top MGMT HR	Human Official arrangement	Resistance of change Lack of commitment
Develop a point system for each riyal spent to redeem free laundry	1	IT/ sales	Financial / IT	Customer's reaction
Reward members with vouchers from restaurants and attractive places often	1	IT/ sales	Financial / IT	Customer's reaction
Run creative promotions with Bundle offers for students, some companies, and ministries	1	Marketing/sales	Financial/marketing	Customer's reaction
Staff training for soft skills and language	1	HR	Human Official arrangement	Lack of commitment
24-hour helpline for loyal clients and other services	1	IT/customer services	Financial / Human	Human / technical
TR14: Prepare a handbook for employees, including used products tutorial	1	HR	Human Official arrangement	Lack of commitment
Self-service machine for drop-off and pick-up 24/7	1	Operations / Sales / customer services	Financial / IT/Human	Financial cost / Technical / Customer's reaction
Built-in cameras to record reception situations	2	IT/customer services	Financial / IT	Technical
Social media marketing plan for greater publicity	2	Marketing	Financial	Financial cost
Branding on a widescreen display	2	IT/customer services	Financial / IT	Technical
Customer feedback buttons in all branches	2	IT/customer services	Financial /Human/ IT	Technical
Partner with brands for detergents, stains, and spray.	2	Sales/customer services	Financial /Human	Financial cost / products quality
Aromatic incense in the store	2	Sales/customer services	Financial	Lack of commitment
Partner with services such as Uber and Careem for delivery	3	Sales/customer services	Financial/ IT	Technical / Customer's reaction

Conclusion

A list of improvements was identified. Based on the analysis, tools, and outcomes, the following recommendations are provided based on this research project.

Although the customers enjoy the current traditional services, it is recommended to gradually introduce more modern services. However, customers need to be able to trust the services being provided and be encouraged to use them. The price is reasonable, and customers are willing to pay the current price. Since this aspect is one of the strengths of the service, the firm can continue to develop and improve so as to achieve consistent and sustainable features. However, promotion is considered an area that customers believe requires improvement. Therefore, it is recommended that a wealth of communication channels (i.e., SMS, social media, posters, flyers, publicity, and word of mouth, etc.) are utilised to converse with customers and advertise promotions. These offers could also be linked and associated with loyalty membership programmes.

Secondly, staff are trusted by the customers. There are several points relevant to their understanding of serving the customer with awareness sessions that take the service and customers satisfaction to the next level. Thus, the company should provide on-the-job training on how to receive customers, smile, and welcome customers. Also, it is important to ensure that they are not distracted by mobile phones or calls while customers are in the store. It was also ascertained that the staff do not promote extra services or seek to cross sell or advise. It is opined that customers are asked about any special services they require. Additionally, this area may represent an opportunity to communicate promotions or a branded labelled detergent or clothes spray. Since there are comments about private branded and labelled products being unavailable, strong and long-term partnerships should be developed with several suppliers to ensure the consistent availability of the products.

Although the customers are satisfied with the existing traditional services, it is suggested that modern and next phase services are introduced, such as self-service. Through this means, customers can take their clothes and wash them in the available machines, enjoy online services, use a drive-thru where there is no inadequate parking, in addition to minimum clothing limits. Arranging a travel bag with cleaned and ironed clothes is an extra service that customers asked for. Thus, it is recommended that the company starts this service immediately as there is no adjustment or investment required. However, it is necessary to identify the process of the customer's clothes being packed and the customer subsequently receiving them. Since the chosen firm, as a brand, is trusted, customers asked the brand to use labelled detergent products and sprays for clothes and the environment. This strong positioning may be further exploited to generate revenue.

To implement the recommendations, the support and trust of the owners and management play a key role. Staff are required to frequently undergo training so that they can provide customers with high-quality service. Serving a customer is not an ad-hoc act. It is a continuous journey that requires considerable commitment. It is therefore opined that a plan should be formulated and a task force should be created. In addition, an accountable person in charge of the actions plans and timing should ensure that the policies, plans, etc., are implemented and executed. The findings and recommendations are not only for laundry services. Hence, they could be extended and applied across a variety of sectors. However, it is vital to consider customers' needs, which is the basis for service quality. It should be noted that this finding has important implications for development.

Limitations

This research was applied in one case, which is a challenge for generalization. Furthermore, this study did not consider the services supply chain challenges and the raw material which is a major factor to deliver quality services. This research also used ServQual and did not consider the version of eServQual for electronic service store.

Future Research Recommendations

Future research may consider expanding the results so as to apply it to other cases in another context. E-laundry concept using e-ServQual may also be considered in future research. Furthermore, the model may be applied in other service industries to validate and understand the results in order to consider generalizability.

In conclusion, the study suggested that businesses focus on customer issues and make customers their main priority. Also, problems can be analysed using the seven Quality Management tools. This is a good area to extend customer needs and increase customer satisfaction. The seven quality management tools are reliable tools which companies can employ to deal with challenges, and it is effective in improving service quality. This in turn positively strengthens organisational performance, customer satisfaction, and success.

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Data Availability: All of the data are included in the content of the paper.

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The Impact of Takaful Insurance on the Manufacturing Industry in Malaysia: Empirical Evidence through ARDL Bounds Testing Approach

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Abstract
        In post-financial crisis, the interconnection between the financial sector and real activity is gaining more interest in the literature. Given that the insurance sector represents a large part of the financial globe, it will be essential to explore its impact on the real economy. Further, the expansion of participative finance, in the last decade, requires contextualising the question in this sense. However, this paper experiments with the effect of Takaful insurance on real activity in Malaysia. Hence, an ARDL model is estimated on quarterly data between 2010Q1 and 2017Q4. The results show a positive and significant impact of the increase in Takaful contributions to manufacturing activity. On the same side, a long-term relationship between the two sides is established in the image of a significative cointegration.

Keywords: Takaful, Manufacturing activity, AutoRegressive Distributed Lags Model

1.   Introduction
        There's no denying that economic agents are operating in an uncertain economic environment. While this nature generates different levels of risk, it is necessary to deal with them. On this path, the insurance industry was instituted. As its essential function is the transfer of risk, the damage derived from the occurrence of certain events seems to be mitigated. In this sense, the resilience of economic agents' balance sheets can be improved in the face of

uncertainty and the associated risks. While the Great Depression of 2008 led to drastic results and severe after-effects, two notes were made. In the first part, there is growing interest in the connection between the financial sphere and economic activity. In this setting, a large literature has investigated the resilience of financial intermediaries as determinant of economic activity, as in (Creel et al., 2014), (Asteriou & Spanos, 2018) and (Intharak et al., 2023). More concretely, a number of studies have highlighted the contribution of the insurance sector as an economic growth leverage (Arena, 2014), (Dash et al., 2018) (Singhal et al., 2022) and (Dawd & Benlagha, 2023).

In the second part, the spotlight on participatory finance is increasingly broadened in the wake of the crisis. This interest can be explained by the relative resilience shown by this branch of finance in the face of the downturn. Indeed, the nature of the participative finance exercise, based on the principle of profit and loss sharing, favors the transfer of part of the negative shocks from the asset side to the liability side. In other words, the deterioration in the balance sheets of financial intermediaries can be channeled, entirely or partially, to those of depositors (Hamza & Saadaoui, 2013). Thanks to this pass-through, institutions operating in participatory finance remain relatively resilient (Greuning & Iqbal, 2007).

As a result, participatory financial institutions are more stable relative to their traditional counterparts (Ibrahim, 2016). In other words, they are well positioned in the face of financial crises (Hasan & Dridi, 2011). Furthermore, the stability of participatory finance cannot be dissociated from an essential component such as *Takaful* insurance. In this sense, the statistics show that the sum of global issuance and *Takaful* assets have risen from 47 billion USD in 2008 to over 170 billion USD in 2019 (IFSB, 2021). In fact, *Takaful* expansion is more significant in some countries than others. In Malaysia, *Takaful* insurance operators' assets have risen exponentially from 114.2 million Malaysian Ringgit (RM) in 2010 to 41,515.2 million RM in 2020[1]. In light of these facts, participatory finance, and more specifically the *Takaful* sector, prescribes itself as a subject for study.

Along the same lines as the two previous notes, this paper aims to verify the communication between the financial sphere and real activity in the context of participatory finance. In fact, its contribution can be located in two dimensions. Firstly, it sheds light on the role of the participatory finance industry, like the *Takaful* industry, in economic prosperity. As the studies developed in this direction are limited, this paper contributes to enriching the empirical literature on the macroeconomic effects of *Takaful* insurance. To the best of our knowledge, three studies have been conducted in this direction. These include (Rawat & Mehdi, 2017), (Shahid, 2018), and (Izzati et al.,

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[1] Bank Negara Malaysia's monthly statistics for December 2020

2020). Only the first of these deals with macro-econometric modeling. Moreover, it examines the link from the point of view of *Takaful* insurance operators' liabilities, as contributions collected, whereas the present study examines it from the point of view of assets. In fact, we believe that looking at the structure of *Takaful* assets can best inform the strategic behavior of insurance companies.

Second, it enriches empirical research on the impact of financial conditions on the business cycle. In other words, it focuses on macro-financial linkage in a participatory context. Although the first dimension receives a large share of the effort in this paper, the second is implicitly considered. In other words, the present work focuses on the empirical verification of the *Takaful* insurance effect on production, represented by manufacturing activity. The rest of this paper is built as follows; in the second section, a literature review is outlined. While the third presents the data and methodology adopted. Whereas the econometric model is specified in the fourth and the results are formulated and discussed in the last.

2.   Literature review

Use In order to understand the theoretical relationship between *Takaful* insurance and economic activity, it will be necessary to explain the operating mechanism of *Takaful* operations. In this sense, a large part of the answer is represented by the nomination itself, a model based on the principle known in Arabic as Taawun, which is synonymous with solidarity as defined by (Hussain & Pasha, 2012) and (Yazid et al., 2012). At the start of the insurance period, institutions operating in this field receive contributions from participants (Archer et al., 2012). While the contract defines the nature of the risks covered, the funds collected constitute the *Takaful* funds that are managed by the *Takaful* insurance operators on behalf of the members. At the end of the period and after deduction of expenses, customer claims, and provisions, the final result is received by policyholders in the form of dividends. This mechanism is derived from the Mudarabah principle as indicated (Billah, 2019). Under the latter, the operator receives a fee for managing *Takaful* funds (Ismail et al., 2021). The last point represents the angle of divergence between conventional and *Takaful* insurance, where the customer's status is closer to that of an investor than a simple insured. Indeed, this is not a transfer, but rather a sharing of risk and responsibility between the members.

While its operation allows for neither Gharar nor Mayssir according to (Hussain & Pasha, 2012) (Malik & Ullah, 2019), *Takaful* insurance can satisfy a good part of the needs of exacting customers in terms of compliance with shariaa principles. Whereas this point may encourage demand in this sector, two effects may be derived from it. On the one hand, through the strengthening

of financial inclusion (Haroun & Effandi, 2019) (Ansari & Bahari, 2021) *Takaful* insurance can allow the conversion of an additional portion of savings into the acquisition of *Takaful* assets. On the other hand, since they provide financial protection and risk mitigation, as underlined by (Alhabshi & Razak, 2011), *Takaful* operations create a hard floor for economic activity (Rawat & Mehdi, 2017). These two effects are bound to boost economic growth by stimulating both saving and investment (Izzati et al., 2020). In this line, (Shahid, 2018) concluded that there is a catalytic effect of alternative insurance, such as *Takaful*, on economic conditions. Although theoretically justified, empirical verification is essential.

3. Stylized facts

Given that the question and model addressed in this paper focus on the impact of the *Takaful* industry on economic activity, an overview of the historical development of the two sides of the relationship is crucial. In this path, the graph below presents a quarterly time series of manufacturing activity output as well as *Takaful* funds. The latter are represented by the assets of direct *Takaful* family operators. These assets include property, plant, equipment, investments, financing, investments such as Malaysian government papers and corporate securities, foreign assets, cash, and deposits.

Although Malaysian *Takaful* insurance covers two categories, general and family, only the amount collected under the latter is considered. There are two main reasons for this choice. The first is related to the difference in the operating methods of the two. While both types of *Takaful* provide the protection function, the Family branch is characterized by the addition of another function, namely the collection of long-term savings. It covers, among others, the risk of death and disability. While the General *Takaful* covers the risk of damage or loss. The term *Takaful* family is therefore likely to generate more stable resources for the economy. Secondly, data from Bank Negara show that the *Takaful* family business represents a significant portion of the Malaysian alternative insurance sector. Assets booked in this segment in 2006 amounted to 23,200 million RM. General *Takaful* assets, on the other hand, did not exceed 3,593 million RM. In light of the above considerations, the present study focuses on family *Takaful*.

**Figure 1.** *Takaful* operators' assets in million RM
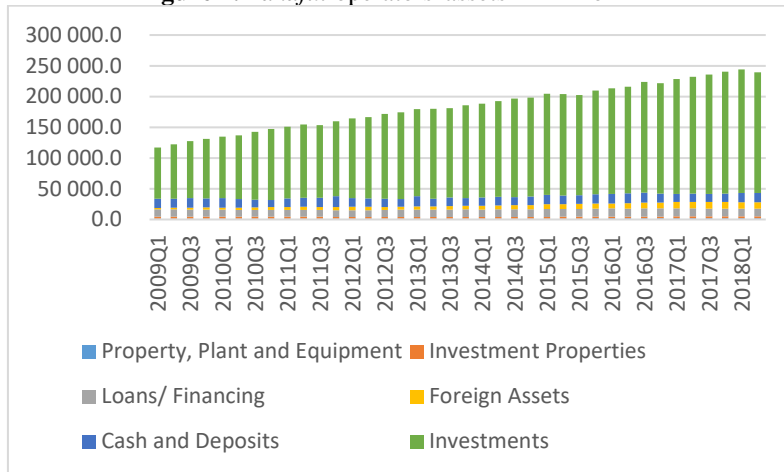
Source: Central Bank of Malaysia – Negara -

In this sense, two notable observations can be made. Firstly, the family *Takaful* industry grew at a sustained rate over the period under review. Without anything more, this evolution can be a leverage for economic growth. As this is essentially due to the increase in private and sovereign securities, the intensity of this leverage is increasingly important. In other words, *Takaful* operators are mobilizing the funds collected, primarily, towards investment. As a result, economic activity can be boosted through this channel. As shown in Figure 2, the decomposition of previous investments reveals the dominance of the effect of acquiring private rather than sovereign securities. Hence, the hypothesis that the *Takaful* industry has a positive effect on economic growth, by encouraging private investment, can be considered.

In order to maintain this hypothesis, it is imperative to observe the evolution of economic activity in Malaysia. Although the structure of the Malaysian economy is diversified, manufacturing takes a special place. Following a structural transformation of the Malaysian economy, economic growth is increasingly driven by manufacturing production. The latter is highly diversified, representing a collection of diverse activities. It is mainly dominated by the production of electrical and electronic machinery, chemicals, petroleum, and coal products. In 2017, these items contributed 22%, 10%, and 15% respectively to the value added of manufacturing activity. In 2020, the latter's contribution to GDP will be 22.31%.

Figure 2. *Takaful* operators' assets in securities in RM million
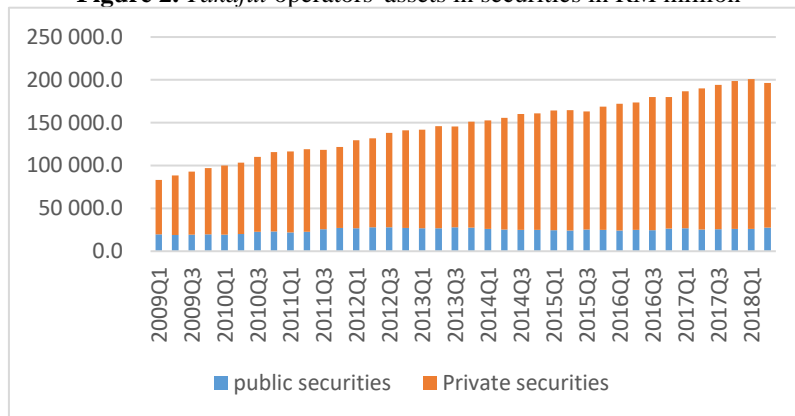
Source: Central Bank of Malaysia – Negara –

At this point, linking the evolution of the manufacturing production time series to that of operators' assets in the *Takaful* insurance is now justified. Since both series have an upward trend, their simultaneous exposure in their unadjusted forms cannot teach significantly in terms of the aforementioned hypothesis. On the other hand, the visualization of their cyclical components may enable this. In this pathway, two transformations were applied to the series in question. First, they are seasonally adjusted using X-13ARIMA-SEATS software. Secondly, the trend effect was removed by applying the HP (Hodrick-Prescott) filter. Both series are expressed in logarithm and the corresponding results are shown in figure 3. Both series are expressed in logarithm and the results are presented in figure 3. The figure shows a matched movement in the volume of *Takaful* family assets and manufacturing output. Certainly, this finding can in no way be taken to imply causality or a relationship between the first and the second. It does, however, call for statistical exploration and econometric verification. Indeed, the correlation between the logarithms of the two series is 98%. Whereas, the empirical verification is shown and discussed in the next section.

Figure 3. Cyclical components of *Takaful* assets and manufacturing output
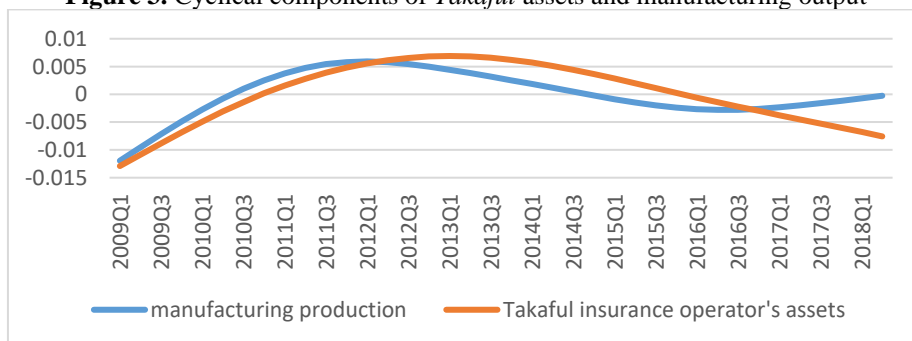
Source: Central Bank of Malaysia – Negara –

4.   Methodology: model specification

Given the objective is to study the effect of *Takaful* insurance on the manufacturing industry, we opt to estimate an econometric model using the software eviews 10. The model considers two variables in the Malaysian economy: the assets of *Takaful* insurance operators and manufacturing output. The period considered is between 2010Q1 and 2017Q4. This is an econometric estimate of an ARDL, the aim of which is to test long-term cointegration between the two variables. Consequently, it not only looks to verify but also to quantify the speed of adjustment between the two variables. With this in mind, the first is $Takaful\_assets_t$. It is represented by the sum of assets shown on the balance sheet of *Takaful* insurance operators in the so-called "family" industry. While the second is captured by the level of production completed by the manufacturing industry Man_t. In fact, it groups together a number of production activities as pointed out in the previous lines. In what follows, both variables are expressed in logarithmic form.

While the query is set on the effect of the variable $Takaful\_assets_t$ on the output of the manufacturing sector Man_t, an ARDL model can be presented, formally, as follows:

$$Man_t = \sum_{i=1}^{n} \emptyset_i \, Man_{t-i} + \sum_{i=0}^{n} \beta_i \, Takaful\_assets_{t-1} + c + \varepsilon_t$$

Where $\emptyset_i$ and β_i denote the ith lag coefficient, respectively, of Man and $Takaful\_assets$. While ε_t represents the term error and c denotes a constant term.

Since the verification of cointegration between the two variables calls for the application of t-Bounds tests, it will be essential to meet the condition of the latter, such as stationarity. More distinctly, Man_t and $Takaful\_assets_t$ must be I (0) or I (1) at most. However, they must not, in any case, be I (2) or higher. In order to verify this condition, two tests, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP), are applied for both variables. The results are shown in Table 1.

Table 1. Stationarity tests for variables

| Variables		ADF			PP		
		Constat	Constant & Trend	None	Constat	Constant & Trend	None
Man_t	Level	-1.69	-4.367*	4.2712	-2.195	-4.5404	5.389
		0.42	0.0070	1.000	0.2114	0.0045	1.0000
	1st difference	-7.56*	-7.68*	-2.62*	-7.83*	-8.0940	-5.11*
		0.0000	0.0000	0.010	0.0000	0.0000	0.000
$Takaful\_assets_t$	Level	-4.10*	-2.7588	8.7190	-3.76*	-2.4629	7.7671
		0.0031	0.2215	1.000	0.0068	0.3434	1.0000
	1st difference	-5.89*	-7.450*	-2.16*	-5.898*	-7.683*	-2.872*
		0.0000	0.0000	0.031	0.0000	0.0000	0.0053

* : significant at 5%   Source: Eviews 10 output, 2023

The results of the ADF test do not allow us to reject the null hypothesis of stationarity at first difference. Indeed, the two variables, Man_t and $Takaful\_assets_t$ are I (1), i.e., stationary at first difference. The same conclusions are provided by the PP test. However, the methodology adopted in the present paper follows the cointegration approach developed by (Pesaran et al., 2001). From this point of view, ARDL model estimation is conditioned by the order of integration of the two series, which must be I (1) at most.

As the two series, Man_t and $Takaful\_assets_t$ are integrated of order 1 or (I), application of the ARDL model T-Bounds test can take place. However, it will be necessary to determine in advance the number of lags to be considered. Given that several models can be estimated according to the number of lags considered, it is essential to select the most accurate one. To this end, the Akaike Info criterion (AIC) was calculated for each of these models. Figure 4 shows the AIC values for each of the estimated models. Since the best model is the one with a high AIC value, the ARDL (3, 4) model was retained.

Figure 4. Models and their AIC
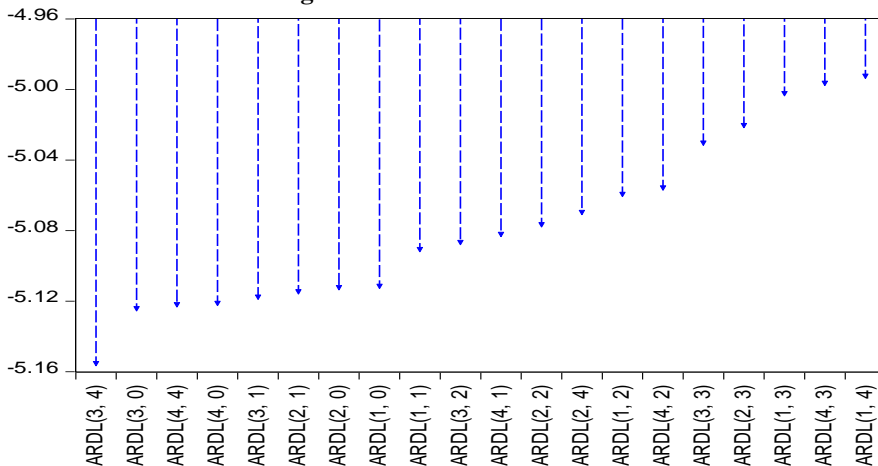
Source : Eviews 10 output, 2023

By setting the maximum lags of the dependent variable and regressor to 4 lags, and relying on Akaike info criterion (AIC), the model selected is an ARDL (3 ,4) after the evaluation of some twenty models. In order to verify the robustness of the selected model, a set of tests is required. Table 2 is designed for this purpose. Indeed, the Jarque-Bera test value is 0.18, which is in favor of rejecting the alternative hypothesis and accepting the null hypothesis. In other words, the errors are normally distributed. As for the Breusch-Godfrey test, it shows a value of 0.753346. Therefore, the null hypothesis of no error autocorrelation is accepted. Furthermore, the Breusch-Pagan-Godfrey value is 0.688131. At this point, his null hypothesis cannot be rejected. Thereafter, the residuals are homoscedastic. Whereas Ramsey's specification test shows a value of 1.033150. In fact, the model is correctly specified and no specification errors were found. In summary, all four tests converge in confirming the non-violation of the model's key assumptions. The last test therefore remains valid.

Table 2. Model robustness tests

Test	Value	Probability	Decision
Omitted variable : Ramsey RESET	1.033150	0.3128	The model does not suffer from a specification error
Normality : Jarque-Bera	0.180224	0.91382	Residuals are normally distributed
Error autocorrelation: Breusch-Godfrey	0.753346	0.4831	The model does not suffer from error autocorrelation
Heteroskedasticity : Breusch-Pagan-Godfrey	0.688131	0.6978	Errors are homoscedastic

Source : Eviews 10 output, 2023

5.   Results

The empirical verification of the relationship between *Takaful* assets and manufacturing output is shown on two levels. The first concerns the qualitative aspect. In other words, it inspects the existence of long-term cointegration between the two components of the potential relationship. In this sense, an ARDL bounds test, as advanced in (Pesaran et al., 2001), was proceeded. The following table shows the results obtained. While the F-statistic displays a value above the critical thresholds in both the upper and lower bounds, the null hypothesis of non-existence of cointegration is rejected. On the other hand, the hypothesis of long-term cointegration between the two variables is maintained. In other words, the results support a long-run equilibrium relationship between *Takaful* assets and manufacturing output. Moreover, the relationship is significant at the 1% level.

Table 3. Bounds test results

	Value	Signif.	I(0)	I(1)
F-statistic	6.204353	10%	3.02	3.51
K	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

Source : Eviews 10 output, 2023

As the long-term relationship has been confirmed in the first level, its quantification remains necessary in the second. In addition, the coefficients of the relationship need to be determined. Given that two horizons of the relationship can be distinguished, short-term and long-term, two categories of coefficients are considered. The table below shows those related to long-term dynamics. In this sense, it shows a positive and significant coefficient value for the explanatory variable, i.e., $Takaful\_assets_t$. In addition, the coefficient is 0.735244. In other words, a 1% increase in *Takaful* assets generates a 73.52% increase in manufacturing output. In summary, a significant effect of *Takaful* insurance on economic activity, like manufacturing, is revealed in the long term.

Table 4. Long-term dynamics coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$Actif\_Takaful_t$	0.735244***	0.039540	18.59514	0.0000
C	2.081458	0.500464	4.159058	0.0004

*** : significant at 1%   Source : Eviews 10 output, 2023

The estimation of short-term coefficients is part of an effort to complete the methodology adopted in this paper. Additionally, to understand the dynamics of long-term variables, we need to know how they behave in the long term. In other words, estimating the short-term relationship is essential to quantifying the speed of adjustment toward long-term equilibrium. To this end, the results of the error correction model (ECM) must be used. The estimated ECM is shown in the table below. They reveal a negative and significant value for the error term coefficient CointEq. As the latter is within the accepted range, i.e., between 0 and -1, the stability of the long-term equilibrium is retained. Moreover, its value indicates that 74.90% of adjustment is achieved in each period.

Table 5. ECM model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MAN(-1))	0.553324	0.217934	2.538954	0.0183
D(MAN(-2))	0.447989	0.197524	2.268026	0.0330
D(L_FAMILY)	0.219742	0.237094	0.926814	0.3636
D(L_FAMILY(-1))	-0.377257	0.237330	-1.58959	0.1256
D(L_FAMILY(-2))	-0.344199	0.243299	-1.41471	0.1705
D(L_FAMILY(-3))	-0.623696	0.265581	-2.34842	0.0278
CointEq(-1)*	**-0.74908*****	0.166539	-4.497953	0.0002

*** : significant at 1%   Source : Eviews 10 output, 2023

6.   Discussion

The results processed in this paper drop in the same direction as those (Shahid, 2018), which affirms the significant macroeconomic implications of the *Takaful* industry. By promoting productivity and enabling economic security, *Takaful* products can stimulate economic activity and subsequently foster prosperity. Along the same lines (Rawat & Mehdi, 2017) used panel data from Malaysian banks and *Takaful* operators to arrive at the same result. There is a significant relationship between total *Takaful* contributions and economic growth. As (Izzati et al., 2020), through a smart-PLS applied in the Malaysian context, investigate and reach the same previous conclusions. They explained the latter by the ability of the *Takaful* industry to convert savings into investment and subsequently increase domestic production. On the other hand, others conclude with a negative relationship between *Takaful* insurance and economic growth. (Rawat & Mehdi, 2017) explains the finding of the inefficiency of the investment strategies adopted by *Takaful* operators.

These results can be explained by the *Takaful* industry's ability to mobilize savings and protect against risk. Given that these functions are similar to those of the conventional insurance sector, similar conclusions can be drawn elsewhere. A study of 29 European countries (Haiss & Sümegi, 2008) demonstrated a positive relationship between life insurance and economic growth. In the same way, (Ward & Zurbruegg, 2000) asserts a cointegration between gross domestic production and insurance premiums. More precisely, through Granger causality, they showed that the latter leads to economic growth.

As for the major specificity of the model, *Takaful* insurance lies in compliance with shariaa (Hassan, 2020). Given that conventional practice in the insurance sector is associated, in the literature, with *Gharar* and *Mayssir*. Indeed, a large proportion of the demand for insurance services is excluded for reasons essentially linked to religion. The conception of an alternative insurance sector, like *Takaful*, is becoming increasingly necessary. It enables us to respond to demand that has escaped the conventional insurance sector.

Subsequently, financial inclusion is promoted as pointed out by (Faisal, 2016), (Haroun & Effandi, 2019), and (Gherbi, 2020).

Conclusion

In the aftermath of the 2008 crisis, the interaction between the financial sphere and real business is receiving increasing attention in the literature. Meanwhile, participatory finance is proving relatively resilient. These two points form the starting line of the present paper. The aim of the latter is to empirically verify the relationship between the Takaful insurance sector and manufacturing activity. To this end, we have opted for an econometric method. In this way, the Bounds Testing approach has been adopted and applied to the Malaysian economy. Based on the time series of family *Takaful* assets and manufacturing output between 2010Q1 and 2017Q4, an ARDL model is specified and estimated using eviews 10. In the light of the results provided by the latter, the cointegration test was conducted. The conclusions are in favor of the existence of a stable long-term relationship between the variables concerned. Given that the coefficients derived from the estimation are positive and significant, the assets of *Takaful* insurance operators positively influence the volume of manufacturing industry output.

These results are in line with those established by (Shahid, 2018) and (Izzati et al., 2020). The relationship finds its foundations in the structure of the *Takaful* insurance model and its ability to drain savings, transforming constituted funds into investments. Subsequently, economic activity can be boosted. However, these results depend on the performance and efficiency of *Takaful* insurance operators' investment strategies. In this sense (Rawat & Mehdi, 2017) present the *Takaful* industry as a brake on economic growth. It is therefore vital to focus professional and academic efforts on improving the performance of *Takaful* insurance operators.

Although this article focuses on the contribution of the Takaful insurance sector to the business cycle, there is a need to examine the mechanisms that enhance the sector's performance. Indeed, a non-performing sector cannot fulfill its function. Subsequently, it cannot boost economic activity. The results obtained in this article therefore require further study. In this sense, it is essential to analyze the performance factors of the Takaful insurance sector.

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Dynamic Effects of Energy Consumption and Economic Growth on CO2 Emission: Testing EKC Hypothesis in Africa

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Abstract

This paper focuses on using time series data on real GDP, energy consumption, and CO_2 emission to examine the effect of economic growth and energy consumption on CO_2 emission for a panel of 23 African countries within the period 1980–2019. The study used Pedroni (1999) approach of panel cointegration analysis to test for existence of long-run cointegration relationship between the variables. Fixed effect model was used to test for the Environmental Kutznets Hypothesis, and income squared was included as an additional explanatory variable. The estimated empirical results for the panel of 23 African countries from fixed effect model indicates the evidence of EKC hypothesis. At the level of individual countries, there is large divergence. 13 countries show evidence of EKC, implying that CO_2 emission has fallen over the long run. As income increases, the levels of environmental damage decreases in those countries. 10 countries show opposite relationship among the variables. Based on the estimated results, it is recommended that countries should pursue economic growth policies that are not highly carbon intensive. Policy makers in these countries should adopt strategies that uses

environmentally friendly technologies to decrease CO2 emission. Countries should also implement strong regulatory and market-based policies in highly energy-intensive sectors to reduce their current level of emissions and attain sustainable, environment-friendly economic growth.

Keyword: EKC Hypothesis, Panel cointegration, African countries

1.0   Introduction

In the economics of African energy markets, three crucial trends have policy implications for economic growth, energy use, and environmental policy formulations. First, Africa has the fastest-growing population and some of the fastest-growing economies globally. Africa also produces and consumes a large fraction of the world's fossil fuels. Therefore, the economic growth of many African economies could lead to a significant increase in demand for energy and carbon emissions.

Secondly, the share of fossil fuels in the total energy mix of Africa has been rising, and this induces rising carbon emissions. Most of these economies cannot carry out their economic activities without burning fossil fuels because they greatly depend on them. In addition, the populace feel entitled to access fossil fuels at an affordable price, especially for oil producing countries.

Thirdly, many developing countries including Africa see global warming as an issue of little or no importance. This is caused by industrialized nations and therefore should be solved by them. According to Bartsch and Mueller, (2000), some even argue that it is a conspiracy by the industrialized nations to impede their development. This assertion reinforces the reluctance of many African developing countries to formulate policies and support investment in cleaner but relatively expensive renewables and less carbon-intensive energy technologies.

Therefore, shifting from fossil fuel consumption to more environment-friendly renewables, biofuel, and nuclear energy is likely to be the best policy for climate change mitigation in Africa. In addition, African developing economies should follow separate growth routes that are viable and less destructive to the environment. Gill et al. (2018) argues that since energy is a crucial contributing factor to pollution, policymakers should formulate distinct policies for renewables by imposing taxes on fossil fuels and subsidizing the renewables.

However, the seeming contradiction between the desire to promote rapid/high levels of economic growth, over-reliance on fossils, and the demand for a cleaner environment from the international community raised some fundamental questions. Firstly, how should the present energy system in these countries support the transition to an expensive, low-carbon energy system without compromising the fundamental objective of achieving a high

level of economic growth in African countries? Secondly, how can the huge potential in less carbon emitting renewable energy technologies be incorporated in the operation and development of a sustainable energy system that is environmentally friendly in these countries? Finally, in what ways can market-based policies (such as proper pricing policies)[1] and demand management policies (that may require a rise in energy prices) be used to change individual behavior in those countries to ultimately follow price signals?

Answers to these questions could lead to energy efficiency as well as a substantial reduction in the consumption of energy and emission of carbon. The key basis for concern is whether the energy and environmental policy makers in these countries can summon enough courage to adopt those policies to attain the four energy policy goals, including security, social concerns, the environment, and competitiveness without fear of backlash from the public and trade unions in these countries. The findings of this research will help in understanding the importance of having a global environmental agenda as well as how to formulate environmental policies in Africa that are consistent with global best practices.

The objective of this paper is to contribute to the existing literature on the Environment Kuznets Hypothesis, specifically focusing on African countries. Firstly, it improves on previous studies by estimating the data in the panel structure while showing country-specific results. Secondly, this study also accounts for the heterogeneity of selected countries in terms of their incomes, energy consumption, and CO_2 emissions by calculating the trends in economic growth, energy consumption , and CO_2 emission in each country. The study is structured as follows. Section two reviewed some stylized facts on the annual growth trends in energy consumption, GDP, and CO_2 emission in 23 African economies. Section three presents empirical literature review, while Section four presents the econometric methods and data. Section five presents the empirical results and discussions. Section six outlines the conclusion and policy recommendation of the findings of the study.

2.0   Trends in   Energy Consumption, GDP, and Carbon (CO_2) Emission

The comparison of annual average growth rates of energy use, economic growth, and CO_2 emission in 23 economies in Africa indicates that there are some level of heterogeneity among those countries in terms of energy utilization, GDP, and CO_2 emission. This diversity is a reflection of some factors including levels of economic growth, and to some extent, energy endowments among selected countries. Between 1980 and 1990, the yearly

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[1] Market-based pricing policies may also attract investment in the sector

average growth of energy utilization ranged from -2.6% to 0.08% in the case of low-income countries of the Democratic Republic of Congo and Gabon, and to 8.2% and 5.6% in oil-producing middle-income countries of Algeria and Kenya. In the decade 1990 to 2000, while Algeria and Gabon recorded a decline in their energy consumption, Libya and Morocco saw an increase in energy consumption at 5.2% and 5.0% respectively from their previous decade. Subsequently, these are higher than the African average of 2.6%. However, the war-ravaged Democratic Republic of Congo and low-income Cote d'Ivoire recorded a negative growth rate in their energy consumption. Comparatively, between 2000 to 2016, most African countries recorded an appreciable increase in energy consumption. Angola and Algeria recorded an annual average rise in energy consumption from 2.4% and 1.9% annually to 6.4% and 5.6% annually between 1990 to 2019. Similarly, for the whole of Africa, the annual average consumption of energy has increased appreciably. Table 1 shows statistics of average growth rate of GDP, carbon emission, and energy consumption in the selected countries.

Table 1. Annual Average Growth Rates of GDP, CO_2 Emission, and Energy Consumption

Country	1980-2016			1980-1990			1991-2000			2001-2019		
Algeria	.1	.7	.8	.2	.8	.2	.9	.7	.1	.6	.7	.0
Angola	.8	.7	.0	.9	.5	.8	.4	.8	.2	.4	2.0	.4
Benin	.4	.8	.1	.0	.7	0	.5	.8	0.8	.8	.0	.1
Cameroon	.8	.7	.3	.2	.3	.8	.3	.4	0.2	.7	.6	.6
Congo	2.7	.6	.5	1.6	.8	.7	.3	.4	5.6	.9	.9	.8
CDR	3.4	.2	0.7	2.6	.9	.7	4.2	5.6	2.9	4.7	.8	.1
Cote'dvour	.8	.2	.0	1.5	.7	.5	4.0	.3	.7	2.4	.08	1.6
Gabon	.8	.0	0.2	.08	.8	.8	.2	.0	1.1	.7	.3	1.1
Ghana	.7	.4	.6	.4	.2	.1	.5	.4	.8	.1	.8	.5
Ethiopia	.8	.1	.5	.2	.9	.9	.6	.8	.4	.8	.4	.4
Egypt	.6	.8	.3	.0	.5	.5	.4	.2	.2	.0	.9	.8
Kenya	.1	.4	.6	.6	.1	.1	.3	.9	.8	.3	.1	.5
Libya	.4	3.6	.4	.3	.3	.7	.2	.2	0.2	.4	.0	.2
Morroco												

.1	.0	.2	.5	.9	.3	.0	.4	.8	.6	.9	.3
Nigeria											
.6	.5	.3	.4	.1	.1	.8	.9	0.2	.5	.4	0.9
Senegal											
.6	.2	.4	.3	.6	.3	.0	.1	.6	.6	.1	.0
South Africa											
.6	.3	.2	.6	.5	.0	.2	.7	.3	.3	.9	1
[2]Sudan											
.9	.0	.9	.7	.5	.0	.2	.8	.3	.4	.0	.5
Tanzania											
.1	.5	.4	.1	.3	.9	.2	.4	0.3	.8	.6	.9
Togo											
.5	.0	.0	.6	.1	.03	.3	.2	.2	.6	.2	.1
Tunisia											
.6	.0	.9	.1	.6	.4	.3	.7	.2	.7	.4	0.3
Zambia											
.0	.5	1.3	.8	.4	2.8	.5	.7	3.4	.2	.1	.5
Zimbabwe											
.4	.6	0.01	.4	.4	.5	.7	.0	0.9	0.4	4.8	3.9

Source: compiled from varied database sources

3.0   Theoritical Framework and Literature Review

The EKC hypothesis predicts that anytime an environmentally toxic indicator is plotted against income per capita, it will behave like an inverted-U-shaped. This relationship was suggested and first used by Grossman and Krueger (1991, 1995) and Panayotou (1994), thus describing the association between the quality of the environment and economic development as shown in Figure 1. In energy literature, the Environmental Kuznets Curve (EKC) hypothesized the relationship between various indicators of environmental degradation and per capita income. In the early stages of economic growth, pollution emission increases and environmental quality declines. However, beyond some level of per capita income (which will vary for different indicators), the trend reverses so that at high income levels, economic growth leads to environmental improvement.

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[2] Including South Sudan
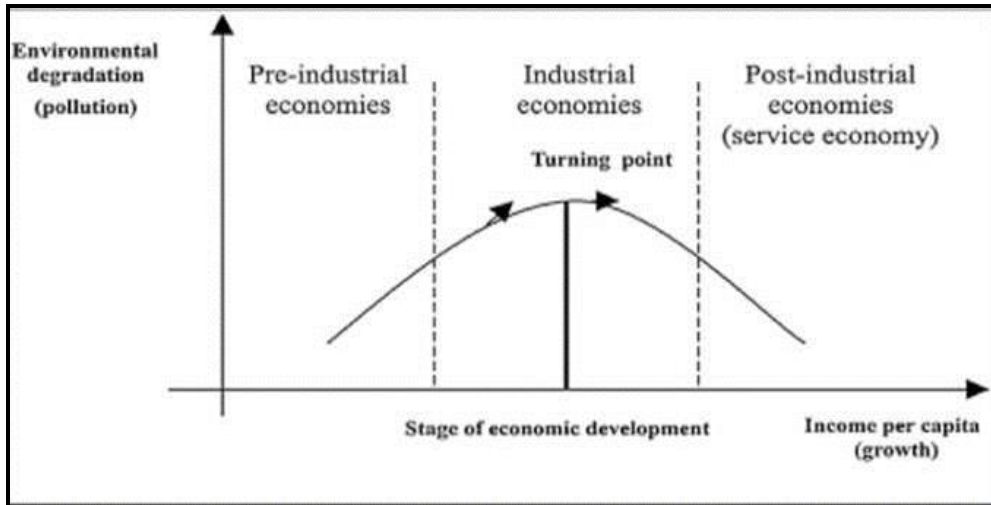
Source: (Panayotou, 1994)
Figure 1. Development Process and Pollution: The Environmental Kuznets Curve

The EKC is named for Simon Kuznets, who hypothesized that income inequality first rises and then falls as economic development proceeds. Emissions of various pollutants, such as carbon dioxide, sulfur, and nitrogen oxides are tightly coupled to the use of energy. Hence, the EKC is a model of the relationship among energy use, economic growth, and the environment.

A plethora of research exists in energy economics, specifically on economic growth, energy utilization, and pollution relationship. However, Kraft and Kraft (1978) is considered to be the earliest study in the relationships. Two dominant areas of research have emerged over the last few decades. The earliest field of research that emphasizes the energy consumption and output growth relationship attempts to ascertain whether economic growth accelerates energy utilization or vice versa.

The second line of research was driven by the global concern for the quality of the environment due to economic growth (and more recently, energy related activities). These studies tried to create the connections between toxic emissions, energy utilization, and income by assessing the authenticity of the environmental Kuznets curve (EKC) hypothesis.

The empirical findings from those studies revealed mixed results. These could be attributed largely to the econometric methodology (Nguyen-Van, 2010) and to some extent, the scope of coverage of the variables used as well as the data set employed by these researchers (Sa'ad, 2010). Table 2 presents a summary of some of the existing studies on the relationship between CO_2 emissions, income, and energy utilization in developing economies.

Specifically, the association between CO_2 emission, energy, and income in the existing literature includes, among others, Perman and Stern, (2003) who assessed the EKC hypothesis using panel data in 74 countries. The

study regressed per capita Sulphur dioxide alongside per capita income and its square. Evidence from their study suggests that an inverted U-shaped EKC hypothesis exists among the countries. Nguyen-Van (2010) used a semi parametric panel data analysis to assess the connection between per capita energy consumption and per capita income. The study found minute indication of the existence of EKC for energy consumption. Menyah and Wolde-Rufael (2010) used the Bound test cointegration approach to investigate the connection between CO_2, energy utilization, and GDP in South Africa for the period 1965 to 2000. The result of his analysis revealed a long-run relationship amongst the three variables. However, the outcome of the causality effect shows a causal linkage running from GDP to CO_2, from energy consumption to GDP, and from energy utilization to CO_2. Panel data was employed for 43 developing countries by Narayan and Narayan (2010) to test for EKC hypothesis using CO_2 emission, GDP, and GDP squared as variables for estimation. The study tested for both individual and country groupings. The empirical evidence based on specific countries revealed that about 35 percent of the countries do not reject the EKC hypothesis, implying that CO_2 has fallen over the long run. Nonetheless, as income increases, the levels of environmental damage decreases in those countries. Similarly, the study also examines the Kuznet hypothesis on the panel of countries based on groupings. The result revealed that it is only in the Middle East and South Asian panels that the EKC hypothesis was not rejected.

Furthermore, Saboori et al. (2012) used Malaysian data for the period 1980 to 2009 to test for the Kuznets hypothesis. Both the long run and short run substantiate the inverted U-shaped curve. Using the vector error correction, Bloch et al. (2012) examined the cointegration and causal relationships amongst coal utilization, output, income, and pollutant emission in China. Their result shows a causality running from coal consumption to output, from income to coal utilization, and from coal utilization to pollutants. Hamit-Haggar (2012) used a panel cointegration approach to study the Kuznets hypothesis in Canada while utilizing the industrial sector as a case study for the period 1990 to 2007. The empirical evidence from the result revealed a long-run association between the series. However, the results of the causality disclose a uni-directional causality among energy consumption, CO_2, and economies, with energy utilization causing CO_2, and there is no evidence of the EKC hypothesis.

Furthermore, Omri (2013) assessed the connections between CO_2, energy utilization, and economic growth by employing a simultaneous equation model with panel data of 14 economies from MENA for the period 1990 to 2011. The result of the study suggests a bi-directional connection between economic growth and CO_2 emission in the region. Furthermore, there is no substantiation to the EKC hypothesis from the reported result.

Between 2016 and 2017, the interest of researchers in this area increased significantly. This attracted so many empirical studies, including Wang et al. (2016) who used Chinese data for the period 1990-2012 to study the cointegrating, temporal dynamic, and casual linkages that exist, thereby connecting economic development, energy use, and CO_2 emissions. The findings of cointegration tests imply that the variables have a long-term cointegrating relationship, but with short dynamic adjustment mechanisms. Similarly, Granger causal relationships were discovered connecting economic growth, energy utilization, and CO_2 emissions. Specifically, a two-way causal connection that connects economic growth and energy utilization was discovered, as well as a uni-directional causal relationship connecting energy utilization and CO_2 emissions.

One of the studies that investigated the EKC in Africa is Lin et al. (2016). The study assessed the authenticity of the hypothesis and the driving components of CO_2 toxicity in five African economies by adopting the panel cointegration and fully adjusted ordinary least squares. In the study, economies of these countries are segregated into agriculture and industrial economics. The findings revealed no proof of the existence of the Kuznets hypothesis in Africa, irrespective of whether development is determined by agriculture or massive production in the economy. The two main forces that determine CO_2 toxicity in Africa are energy intensity and energy structure. The growth in population and urban development has a negative impact on CO_2 toxicity. The authors suggest that the Kuznet curve is not a firm foundation for an environmental course of action in Africa. Therefore, the environmental course of action in Africa, specifically for CO_2 emissions palliation, should concentrate on fostering energy efficiency, boosting the use of clean energy, incorporating the effects of the growth of population, and exploiting the positive impacts of urban development.

Özokcu and Özdemir (2017) used data between 1980 and 2010 in panel data estimation techniques to investigate the relationship between CO2 emissions and the level of income in the context of the EKC in 26 OECD and 52 emerging economies. The results of both N and inverted N-shape models reveal the relationship for cubic functional form. Consequently, the results are not in compliance with the EKC hypothesis. This implies that economic growth cannot solve environmental degradation automatically.

Similarly, Mirza and Kanwal (2017) used data from 1971 to 2009 to examine the connection between energy consumption, growth, and CO_2 in Pakistan via a causality test. Also, the long-run bi-variate relationship amongst the variables is captured. The result revealed that the variables have a bi-directional causality running from energy consumption to CO_2 and from economic growth to CO_2 in the long and short-term periods.

Furthermore, Ali et al. (2017) reinvestigated the existence of EKC in Malaysia for the period of 1971-2012. The study empirically investigated the effect of financial development, real GDP, trade openness, foreign direct investments, and energy consumption on CO_2 emissions around the bands of EKC structure. The study utilized the ARDL bound test to assess the long-run relationship among the variables, and the causality test to examine the relationships. The empirical result revealed that the EKC hypothesis prevails in Malaysia. The causality test uncovered that energy consumption and carbon emissions have a bidirectional relationship. Conversely, the other variables uni-directionally causes CO_2 emissions. In the short run, there is absence of bidirectional causality between the variables. The uni-directional causalities run from trade openness and FDI to economic growth, financial development, and CO_2 emissions. Subsequently, the uni-directional causality from other variables towards CO_2 emissions backs the EKC hypothesis.

Atasoy (2017) tested the EKC hypothesis for 50 U.S. states during the 1960-2010 period using topical panel data that take account of cross-sectional dependence and heterogeneity. The findings prove that the Augmented Mean Group estimator strongly backs the EKC hypothesis. This affirms that the EKC holds in 30 of the 50 states, and the turning points for income per capita lies between \$1292 and \$48597. Conversely, Common Correlated Effects Mean Group Estimator disapproves the EKC hypothesis, and the EKC holds only in 10 states with a defining moment between \$2457 and \$14603. Gill et al. (2017) evaluated the relevance of the Environment Kuznets Curve (EKC) hypothesis to the environmental problem of the world. To accomplish this objective, different aspects of the EKC have been critically analyzed in the study. The study concludes that EKC's growth strategy "grow now clean later" is resource intensive and has an immense environmental cost that the earth may not be able to take up in the future.

Lean and Smyth (2010) assessed the causal connection between CO_2 emissions, consumption of electricity, and economic growth in five ASEAN countries from 1980-2006 using Panel Vector Error Correction Models. The result indicates evidence of a positive connection between the consumption of electricity and emissions in the long run. In addition, the relationship connecting CO_2 emissions and real output is nonlinear, which is out of the EKC. The results further revealed a one-way causal effect between electricity consumption and CO_2 emission to economic growth. Nonetheless, in the short run, there is evidence of one-way causality from CO_2 emissions to electricity consumption. Similarly, Tan et al. (2014) analyzed CO_2 emissions, energy consumption (measured by two proxies), and per capita GDP for Singapore over the period 1975–2011 by utilizing the cointegration and causality techniques. However, the results reveal a significant rise in CO_2 emissions as GDP rose over the years, indicating a trade-off between environment and

growth in the short run. Furthermore, the results of causal analysis indicate that CO_2 emissions caused a decline in economic growth in Singapore. Solarin and Lean (2016) examined how CO_2 emission in China and India respond to natural gas consumption, urbanization, and output for the period 1965-2013 using the cointegration technique. Based on the result, long-run relationship exists among the variables. Also, the existence of positive long-run impact of real GDP, natural gas, and urbanization on CO_2 emission in the two countries shows no evidence of EKC. Omaye et al. (2022) explored this relationship in African countries whithin the framework of energy transition. The study recommends adoption of both techonology and market-based policy to promote environmental sustainability in Africa.

Table 2. The Summary of Empirical Results for Developing Countries

Study	Methodology	Period	Country	Remark
Perman & Stern (2003)	Panel Co-integration		74 countries	Inverted U shaped both in the long and short run.
Menyah & Wolde-Rufael (2010)	Bound test approach to Co-integration	1965–2006	South Africa	$CO_2 \rightarrow$GDP Energy Consumption $\rightarrow$ GDP Energy consumption $\rightarrow$ CO_2
Narayan & Narayan (2010)	Panel Co-integration	1980-2004	43 Developing countries	Mix results
Sa'ad (2010)	Co-integration and Vector Error Correction Models	1971–2006	Nigeria	One-way causality-running from GDP to energy
Nguyen-Van (2010)				No evidence of the existence of EKC for energy consumption.
Wang et al. (2016)	Panel Co-integration	1995-2007	China	Bi-directional CO_2 $\rightarrow$Energy, Energy $\rightarrow$ GDP, Energy, GDP jointly $\rightarrow$ CO_2
Saboori et al. (2012)	Co-integration	1980-209	Malaysia	Inverted U both in long and short run.
Hamit-Haggar (2012)	Panel Co-integration analysis	1990-2007	Canadian industrial Sector	Energy consumption $\rightarrow$ greenhouse gas emissions; Economic growth $\rightarrow$greenhouse gas emissions
Omri A.,(2013)	Simultaneous equations models	1990-2011	14 MENA Countries	Energy consumption$\leftrightarrow$ GDP Energy consumption $\rightarrow$ CO_2

Mirza & Kanwal (2017)	Vector Error Correction Models	1971-2009	Pakistan	bidirectional causalities between energy consumption, economic growth and the CO_2 emissions
Özokcu & Özdemir (2017)	Panel data estimation techniques	1980 – 2010	26 OECD&52emerging economies	
Ali et al. (2017)	ARDL	1971-2012	Malaysia	Unidirectional causality from other variables towards CO_2 supports the evidence of EKC
Atasoy (2017)	Panel data estimators	1960-2010	50 US States	EKC holds in 30 of the 50 states
Gill et al. (2017)				
Solarin & Lean (2016)				
Lean & Smyth (2010)	Panel Vector Error Correction Models	1980-2006	ASEAN	$CO_2 \rightarrow$ Economic growth, energy consumption $\rightarrow$ economic growth. Consistent with EKC
Tan et al. (2014)	Co-integration and Causality Techniques	1975–2011	Singapore	$CO_2 \rightarrow$ Economic growth
Solarin & Lean (2016)	Co-integration Techniques	1965-2013	China and India	No evidence for EKC

Source: Author's computation

4.0.   Methodology
4.1   Research Design

This study investigates the dynamic relationships between four variables, namely: energy, carbon emission, real GDP, and real GDP squared. The variables are constructed as follows: Per capita GDP are real GDP in billions of US dollars and is divided by the population of each country. Per capita energy consumption is the total energy consumed by end user sectors for each country in tons of oil equivalents (toe) and is divided by population. Per capita CO_2 emission and the CO_2 emission in tons is divided by the population of each country. The description of the variables are provided in Table 3.

Table 3. Definitions and Descriptions of the Variables

Variable	Symbol	Description	Data Source
Natural logarithms of GDP as a measurement of economic growth	lnY	Real GDP in billions of US dollars 2010 prices	Worldbank development indicators (*WDI - Home*, n.d.)
Natural logarithms of energy consumption	lnE	Total energy consumed in each country in tons of oil equiverlents	Internatioinal Energy Agency
Natural logarithms of carbon emission	$lnCO_2$	Carbon dyodide emission in tons by various sectors diveded by population	Amerian Energy Information Administration
Natural logarithms of GDP^2 as a measurement of turning point for environmental quality	$Ln\ Y^2$	Turning point in which the quality of environment is expected to improve	

Source: Author's computation

4.2   Panel Unit Root Test

Panel data analysis is a known analysis among social scientists, and it includes the *N* cross-sectional (countries, households, firms) and *T* time series data (yearly, quarterly, monthly). The combination of cross-section and time series data in a single unit increases the number of observation by adding up developments overtime and the variation amongst the series. This significantly reduces the amount of noises emerging from a single time series and addresses the problem of heteroscedasticity in residuals. In order to investigate the dymamic long-run relationship between economic growth, energy consumption, and carbon emission among 23 African countries, a balanced panel data is built (i.e., the same time periods are available for all cross-section units). When a panel data is unbalanced, it will be difficult to handle when running it.

The empirical analysis centered on the subject and the data analysis gives significant merits upon the cross-sectional research. The most relevant feature of panel data studies reveal that change is openly incorporated into the design. As a result, individual changes in a set of variables are directly assessed to examine whether the variables have a panel unit root. However, a number of panel unit root tests have been developed by Breitung (2000), Hadri (2000), IPS (2003), Choi (2006), Levin et al. (2002), and Lluís Carrion-i-Silvestre et al. (2005), among others. This study adopted the panel unit root tests proposed by Levin et al. (2002), IPS (2003), and Breitung (2000). Both tests are first generation test and allowed for individual time series to cross-sectionally and independently be distributed in the panel.

The study started by running a panel unit root. This was folllowed by a panel cointegration test based on Pedroni (2004) methods and the long run

estimates of elasticities based on panel and individual country OLS. Theoretically, a positive relationship is expected between CO_2, economic growth, and energy consumption. However, economic growth squared is expected to have an inverse relationship with CO_2 emission. *A priori,* a negative relationship is expected between CO_2 and economic growth squared, thus suggesting the existance of EKC relationship. In the absence of *a priori* expectation in a country, a low level of development is witnessed. As a result, real incomes and energy use are highly polluted. By implication, there is a need for market-based policy and adoption of new technology to improve the quality of the environment.

$$y_{it} = \eta_{it} + \sum_{k=1}^{p+1} \beta_{ik} x_{i,t-k} + \varepsilon_t \tag{1}$$

The test statistic assesses the H_0 that the process is differenced stationary:

$$H_0: \sum_{k=1}^{p+1} \beta_{ik} - 1 = 0 \tag{2}$$

The other option identifies that the panel series is stationary; that is $\sum_{k=1}^{p+1} \beta_{ik} - 1 < 0$ for all *i*. Breitung (2000) uses the following transformed vectors to build the test statistic:

$$Y_i^* = AY_i = \left[y_{i,1}^*, y_{i2,}^*, \ldots, y_{i,T}^* \right] \tag{3}$$

$$X_i^* = AX_i = \left[x_{i,1}^*, x_{i2,}^*, \ldots, x_{i,T}^* \right]', \tag{4}$$

indicating the following test statistic

$$\lambda_B = \frac{\sum_{i=1}^{N} \sigma_1^{-2} Y_i^{*'} X_i^{*'}}{\sqrt{\sum_{i=1}^{N} \sigma_1^{-2} X_i^{*'} A' A X_I^*}} \tag{5}$$

which shows a standard normal distribution.

4.3   The Panel Cointegration Tests

Pedroni (2004) is employed and it incorporates the trend coefficient and heterogeneity across the cross-sections in the panel. However, it measured the following panel regression:

$$Y_{it} = \alpha_{it} + \delta_{it}t + X_i\beta_i + e_{it} \tag{6}$$

where Y_{it} and X_{it} are the apparent variables, including per capita GDP, per capita energy consumption, per capita CO_2 emission, and per capita income squared with dimension of (N * T) x 1 and (N* T) x m, respectively. α_{it} and δ_{it} are fixed effects for every country and is a deterministic trend. e_{it} is the stochastic error term. Pedroni (1999) creates asymptotic and determinate-sample properties of testing statistics to assess the H_0 of no-cointegration in the panel. The tests permit for heterogeneity among every single member of the panel, including heterogeneity in the long-run cointegrating vectors and in the dynamics. This is because there is no evidence to accept that all parameters are alike across countries.

Pedroni suggested two types of hypothesis testings: (i) the within-dimension approach, which includes four statistics: panel v-statistic, panel ρ-statistic, panel PP-statistic, and panel ADF-statistic. These statistics merge the autoregressive coefficients across different members for the panel stationarity tests on the estimated residuals. (ii) the between-dimension approach consist of three statistics, which are: group q-statistic, group PP-statistic, and group ADF-statistic. These statistics accounts on estimators that simply average the individual coefficients for each member. Following Pedroni (1999), the heterogeneous group mean panel and heterogeneous panel cointegration statistics are calculated as follows:

Panel v-statistic

$$Z_v = \left(\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^2 \right)^{-1} \tag{7}$$

Panel ρ-statistic

$$Z_\rho = \left(\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^2 \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{e}_{it-1} \Delta \hat{e}_{it} - \hat{\lambda}_i \right) \tag{8}$$

Panel PP-statistic:

$$Z_t = (\hat{\sigma}^2 \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2} \hat{e}_{it-1}^2)^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2}(\hat{e}_{it-1}\Delta\hat{e}_{it} - \hat{\lambda}_i) \qquad (9)$$

Panel ADF-statistic

$$Z_t^* = (\hat{s}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2} \hat{e}_{it-1}^{*2})^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2} \hat{e}_{it-1}^* \Delta\hat{e}_{it}^* \qquad (10)$$

Group ρ-statistic

$$\tilde{Z}_\rho = \sum_{i=1}^{N} (\sum_{i=1}^{T} \hat{e}_{it-1}^2)^{-1} \sum_{t=1}^{T} (\hat{e}_{it-1}\Delta\hat{e}_{it} - \hat{\lambda}_i) \qquad (11)$$

Group PP-statistic

$$\tilde{Z}_t = \sum_{i=1}^{N} (\hat{\sigma}^2 \sum_{i=1}^{T} \hat{e}_{it-1}^2)^{-1/2} \sum_{t=1}^{T} (\hat{e}_{it-1}\Delta\hat{e}_{it} - \hat{\lambda}_i) \qquad (12)$$

Group ADF-statistic

$$\tilde{Z}_t^* = \sum_{i=1}^{N} (\sum_{i=1}^{T} \hat{s}_i^2 \hat{e}_{it-1}^{*2})^{-1/2} \sum_{t=1}^{T} (\hat{e}_{it-1}^* \Delta\hat{e}_{it}^*) \qquad (13)$$

5.0 Empirical Results and Discussions
5.1 *Empirical Result*
The panel unit root result is presented in Table 4 based on three tests (Breitung, IPS and LLC). The result confirms that all the three variables have unit roots. Therefore, this suggests that the series shared the same integrational properties of I (1). Based on the result, the test for cointegration is carried out

in order to determine the posssibility of a long-run relationship between CO_2, energy and income, and income squared.

Table 4. Results of Panel Unit Root Tests

Variables	Breitung test		IPS test		LLC test	
	Level	First difference	Level	First difference	Level	First difference
E	1.40	-8.57	8.29	-13.7	2.30	-11.28
	(0.920)	(0.00)	(1.00)	(0.00)	(0.98)	(0.00)
Y	2.48	-2.96	9.42	-9.43	4.38	-5.14
	(0.99)	(0.00)	(1.00)	(0.00)	(1.00)	(0.00)
Y^2	-0.31	-1.64	11.45	-7.24	6.98	-3.34
	(0.37)	(0.04)	(1.00)	(0.00)	(1.00)	(0.00)
CO_2	-1.62	-9.91	2.85	-14.86	-0.22	-12.08
	(0.05)	(0.00)	(0.99)	(0.00)	(0.40)	(0.00)

Note: probability values in parenthesis

Table 5. Panel Cointegration Result

	Panel(within dimension)			(between dimension)		
	Statistics	Value	Probability	Statistics	value	probability
	Panel v-					
stat		3.68**	0.0001			
	Panel	-		Group		
rho-stat		0.68	0.2453	rho-stat	0.18	0.5736
	Panel	-		Group	-	
PP-stat		2.99**	0.0014	PP-stat	3.51**	0.0002
	Panel	-		Group	-	
ADF-stat		0.27**	0.0928	ADP-stat	2.03**	0.0214

*Note: deterministic intercept and trend are included in the estimation. **suggest rejection of null hypothesis at 5%*

The panel cointegration result is presented in Table 5 and it consist of both the within and between group dimension. For all the tests rejected, the H_0 accepted panel rho and group rho which failed to reject the H_0. However, the rho statistics recorded a power less than the PP statistics. For the other statistics that rejected the H_0, it may be rational to assent to the existence of the long-run cointegration among the series.

$$lnCO_2 = -5.423 + 0.376lnE + 1.804lnY - 0.142lnY^2 \qquad (17)$$
$$(-13.003) \quad (6.546) \quad (15.873) \quad (-10.020)$$

R^2 0.97, Jarque-Bera normality test 15.53(0.000)

The Houseman test favours fixed effect against the random effect model. The long run elasticities from the estimated fixed effect model are reported in equation 17. The result shows that the estimated coefficients of

explanatory variables are all statistically significant with correct expected signs. The coefficients of energy and income have a positive relationship with the dependent variable. This denotes that increase in energy consumption and per capita income will, *ceteris paribus,* lead to increase in damage to the environment. However, as income increases further, the quality of environment tends to improve. This is shown by the negative sign on the coefficient of Y^2. Accordingly, this result substantiates the EKC hypothesis . The adjusted R^2 of 0.98 and the JB normality test indicates that the data fits into the model quite well, regardless of the problem of non-normality. Nonetheless, in panel analysis, the post estimation test do not count as much because it is not necessary.

Table 6. OLS Estimates (ln CO_2 as dependent variable)

Country	ln						Remarks
	nY	-Stat	Y^2	-Stat	nE	-Stat	
Algeria	.85	.75	-0.002	4.98	.004	.42	EKC Accepted
Angola	.62	.80	-0.005	4.90	.002	.02	EKC Accepted
Benin	0.62	5.80	0.004	.90	.002	.02	EKC Rejected
Cameroon	.02	.08	0.003	.70	.0017	.97	EKC Rejected
Congo	.05	.87	-0.99	2.79	0.0007	0.25	EKC Accepted
CDR	.23	.84	-0.004	2.01	0.0004	5.47	EKC Accepted
Côte d'Ivoire	.17	.43	0.0003	.14	.97	.17	EKC Rejected
Gabon	.11	9.71	-0.024	11.78	0.003	7.03	EKC Accepted
Ghana	.34	.71	-0.55	12.92	.0003	6.03	EKC Accepted
Ethiopia	.07	.88	-4.96	0.083	6.83	0.18	EKC Accepted
Egypt	.53	.25	-0.0003	1.201	.0008	.90	EKC Rejected
Kenya	0.02	0.20	0.002	.709	0.0002	0.36	EKC Accepted
Libya	.003	.42	-0.29	2.827	.001	.91	EKC Accepted
Morocco	0.293	1.91	0.003	.428	0.001	1.91	EKC Rejected
Nigeria	.34	.50	-0.002	2.976	.003	.38	EKC Accepted
Senegal	.16	.23	0.003	.188	.0008	.24	EKC Rejected
South Africa	.84	.10	-0.0004	1.494	0.001	0.71	EKC Accepted

Country							EKC
Sudan			0.				EKC Rejected
	0.12	0.69	002	.73	.0012	.40	
Tanzania			-				EKC Accepted
	.22	.92	0.001	1.91	.0004	.56	
Togo			0.				EKC Rejected
	0.21	1.11	026	.53	.0023	.93	
Tunisia			-				EKC Rejected
	.42	.25	0.004	2.15	.004	.44	
Zambia			-				EKC Accepted
	.56	.68	0.016	6.15	.0008	.93	
Zimbabwe			0.				EKC Rejected
	0.55	0.12	31	.71	.002	.88	
Panel(without time dummies)	1.93	(9.43)	-0.15	(6.18)	0.36	(3.52)	EKC Accepted
Panel(with time dummies)	1.07	(3.9)	-0.09	(-2.6)	0.042	(0.26)	EKC Accepted

Note: the t-statistics is in parenthesis

The findings of each country and the panel OLS estimates are stated in Table 6 above. From the result of the panel estimates, with and without time dummies presented at the bottom of the table shows that Y and Y^2 coefficients are significant at 5% levels. However, E is statistically insignificant. According to the result, income appears to have more influence on CO_2 than energy in these countries during the estimation period. However, in the panel without time dummies, all explanatory variables are statistically significant. Y^2 has a negative sign, which implies an inverse relationship between CO_2 and Y^2. Nevertheless, the two models substantiates the EKC hypothesis in the long run. The elasticity of Y, with respect to CO_2, is greater than   1. Notwithstanding, the coefficients of E and Y^2 are less than 1. The result therefore suggests that income appears to have more influence on the quality of environment than energy.

5.2   Discussion

Based on the results from specific country basis, most of the estimated coefficient of income and income squared elasticity are statistically significant ranging from 1% to 10% levels. The result of 13 countries shows that income and energy have a positive and significant connection with CO_2. However, income squared has a significant negative influence on CO_2, implying that CO_2 has fallen over the long run. As income increases, the levels of environmental damage decreases in those countries. The countries that support EKC hypothesis include, Algeria, Angola, Congo, CDR, Gabon, Ghana, Egypt, Libya, Nigeria, South Africa, Tanzania, Tunisia, and Zambia. However, Congo and CDR have negative energy elasticities. The magnitute of the income elasticities ranges from 0.16 for Senegal to 1.34 for Nigeria. The coefficient of the income squared ranged from -0.99 for Congo to -0.002

in Algeria. Furthermore, estimates for Benin, Cameroon, Zimbabwe, Togo, Sudan, Kenya, and Ethiopia are either not statistically significant or have wrong signs on their coefficients. Arguably, the likely reasons for the poor quality of results for these countries is probably due to the poor quality of the data and some have inhouse political crisis over a long time. However, there is no evidence to support the EKC in 10 countries. Based on the estimation period of those countries, a significant rise in real incomes did not have postitive and significant effects on the quality of environment.

Conclusion and Policy Implications

Recently, the international community has expressed great concern over the role of energy and economic activities in environmental quality. Similarly, there have been growing literature in both OECD and non-OECD countries that investigate the effect of energy consumption and economic growth on the quality of environment (mostly represented by CO_2 emission), known as the EKC hypothesis.

This study contributes to the growing literature by examining the possibility of any long-run asociation between energy consumption, economic growth, and economic growth squared on CO_2 emission for the selected 23 African countries. The empirical findings suggest that there is an evidence of cointegration between energy consumption, GDP, GDP squared, and CO_2 emission at panel level.

However, specific result suggest that energy consumption related activities increased carbon emission in most of the countries. Also, a negative and significant impact of income squared and CO_2 emission exists. This indicates that in nearly 60 percent of the countries, CO_2 emission decreases as income increases, which substantiates the EKC hypothesis.

The policy implications for the result indicates that most of the countries should pursue economic growth policies that are not highly carbon intensive, and projects that promote energy efficiency should be increased. In addition, renewable energy technologies that reduce environmental pollution are highly recommended for policy makers in these countries. For countries where there is no evidence of EKC, strong regulatory policies should be implemented with market-based incentive to regulate highly energy-intensive and polluting sectors in order to achieve sustainable environmental friendly growth.

Finally, it must be emphasized that for all the countries, market-based incentives such as soft loans and tax holidays, aimed at increasing the consumption of renewable energy and less carbon-intensive activities, can boost economic growth to reach the turning point. As a result, the association between energy consumption and growth will improve the environment.

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Valorisation du Capital Immatériel par le Marché Financier : Une Analyse Empirique sur le Marché Financier Régional de l'UEMOA

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Résumé

L'objectif de ce papier est d'analyser la valorisation du capital immatériel par le marché financier. L'analyse de régression sur des données de 20 entreprises cotées sur le Marché Financier Régional prouve que les informations liées au capital structurel publiées dans les rapports annuels sont valorisées positivement par les investisseurs. Toutefois, nonobstant la politique de communication soutenue des entreprises en matière de capital humain, le capital humain est valorisé négativement par le marché financier. Le marché financier ne perçoit pas le capital humain comme étant un facteur clé de création de valeur et de compétitivité. Relativement au capital relationnel, aucune relation n'a été mise en exergue. Eu égard aux conclusions de cette recherche empirique, les dirigeants d'entreprises cotées doivent communiquer davantage des informations pertinentes et suffisantes aux investisseurs sur le marché financier sur les différentes composantes du capital immatériel pour une meilleure valorisation de leurs titres. D'ailleurs, l'originalité de cette étude réside dans le fait qu'elle est la première recherche à fournir une preuve empirique de la valorisation, par les investisseurs sur le marché financier régional, des informations extra financières communiquées sur les composantes du capital immatériel dans les rapports annuels des

entreprises cotées.

Valuation of Immaterial Capital by the Financial Market: An Empirical Analysis of the Regional Financial Market an Empirical Analysis of the WAEMU Regional Financial Market

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Abstract
        The objective of this paper is to analyze the valuation of intangible capital by the financial market. Regression analysis on data from 20 companies listed on the Regional Financial Market proves that information related to structural capital published in annual reports is positively valued by investors. However, notwithstanding the sustained communication policy of companies in terms of human capital, human capital is negatively valued by the financial market. The financial market does not perceive human capital as a key factor in creating value and competitiveness. Regarding relational capital, no relationship has been highlighted. Given the conclusions of this empirical research, managers of listed companies must communicate more relevant and sufficient information to investors in the financial market on the different components of intangible capital for a better valuation of their securities. Moreover, the originality of this study lies in the fact that it is the first research to provide empirical proof of the valuation, by investors on the regional financial market, of extra-financial information communicated on the components of intangible capital. in the annual reports of listed companies.

Keywords: Intangible capital, structural capital, value creation, financial market, stock market valuation

Introduction
        Au fil du temps, l'économie mondiale s'est déplacée d'une économie fondée sur les actifs physiques (comme les usines et les terrains) vers une

économie de plus en plus axée sur le capital immatériel. Les actifs immatériels, tels que la propriété intellectuelle, la technologie, les marques et la réputation, jouent un rôle de plus en plus critique dans la création de valeur et la compétitivité des entreprises. En effet, dans l'économie actuelle axée sur le savoir, les investissements en capital immatériel tels que la recherche et développement (R&D), la formation des employés et les relations avec la clientèle, jouent un rôle primordial dans la création de valeur ajoutée. Ces éléments sont désormais considérés comme les principaux moteurs de croissance et de succès économique (Maaloul & Zéghal (2015)).

En dépit de la dématérialisation croissante de la politique d'investissement des entreprises au fil du temps, la comptabilité ne mesure que partiellement l'immatériel. La dimension des actifs immatériels est encore insuffisamment intégrée dans les outils d'aide à la prise de décision fondés sur le bilan, le compte de résultat ou le retour sur investissement (Abbey (2017)). Assurément, les outils d'aide à la prise de décision, tels que les modèles d'évaluation financière, les indicateurs de performance et les analyses de risques, ont historiquement été axés sur les aspects tangibles et mesurables des entreprises, tels que les données financières et les actifs matériels. Les méthodes traditionnelles d'évaluation financière, telles que l'actualisation des flux de trésorerie, ne capturent pas toujours adéquatement la valeur des actifs immatériels.

En conséquence, cette lacune de la comptabilité relativement à la reconnaissance comptable par les normalisateurs comptables du capital immatériel complexifie leur évaluation ainsi que celle des entreprises (Casta, Ramond et Escaffre, 1997). Bien plus, contrairement au capital technique, l'évaluation du capital immatériel s'avère difficile en raison de son caractère protéiforme et de sa nature hétéroclite. Effectivement, cette complexité réside dans l'évaluation des cash flows futurs générés par le capital immatériel ainsi qu'à leur degré d'incertitude très élevé. Pour Lev (2003), cette déficience de la comptabilité est source de mauvaise répartition des ressources sur le marché financier.

De ce fait, eu égard la perte de pertinence des états financiers, pour signaler leurs performances futures et perspectives de croissance aux investisseurs, les entreprises gagneraient à élargir leur communication autour de leur capital immatériel. Par ailleurs, plusieurs travaux (Lev, 2000 ; Cazavan-Jeny, 2004 ; Hulten et Hao, 2008) ayant vu le jour, tentent de motiver l'écart entre la valeur de marché et la valeur comptable des entreprises par la non prise en compte du capital immatériel dans les états financiers (Dammak, 2015). En effet, dans le contexte américain, Francis et Shipper (1999) concluent l'existence d'une forte corrélation entre la valeur boursière des entreprises et les informations publiées relativement aux composantes du capital immatériel. D'ailleurs, c'est à ce titre que Gonne, Bello et Feudjo

(2019) affirment que les dirigeants d'entreprise peuvent user de ces actifs immatériels comme signaux pour communiquer aux marchés financiers les potentialités de croissance et de rentabilité de leur entreprise. Par exemple, une entreprise technologique peut mettre en avant ses brevets et ses innovations pour signaler sa capacité à développer de nouveaux produits et à saisir des opportunités sur le marché.

De même, une entreprise axée sur la qualité du service client peut mettre en avant sa réputation et ses relations solides avec les clients pour signaler sa capacité à fidéliser sa clientèle et à générer des revenus récurrents. Cette assertion est soutenue par la théorie des ressources et par la théorie du signal. En conséquence, les dirigeants peuvent également utiliser des stratégies de communication telles que les rapports annuels, les présentations aux investisseurs et les communications publiques pour mettre en évidence le capital immatériel de l'entreprise. Ces efforts visent à créer une perception positive chez les investisseurs et à influencer leurs décisions d'investissement en démontrant le potentiel de croissance et de création de valeur de l'entreprise. Toutefois, il est important de noter que la communication des dirigeants concernant les actifs immatériels doit être cohérente, transparente et soutenue par des preuves tangibles (Boucheny, 2000). Les marchés financiers sont devenus de plus en plus conscients de l'importance des actifs immatériels, et les investisseurs sont de plus en plus exigeants quant aux informations fournies par les entreprises pour évaluer ces actifs de manière objective.

Sur le marché financier régional de l'UEMOA (Union Economique et monétaire de l'Afrique de l'Ouest, une étude réalisée par Ossonon (2017) dénote une perception négative des immatériels inscrits au bilan par les investisseurs. De ce fait, en raison de l'absence de réglementation portant la divulgation volontaire d'informations sur le capital immatériel, les entreprises devraient communiquer volontairement des informations non financières portant sur le capital immatériel (capital structurel, capital humain, capital relationnel) dans leurs rapports annuels afin de réduire l'asymétrie informationnelle pour une meilleure valorisation de leurs titres par les investisseurs sur le marché financier régional. Poursuivant ses recherches, dans une étude réalisée sur le marché financier régional, Ossonon (2022) démontre que les entreprises opérant sur le marché financier régional communiquent volontairement des informations sur les composantes du capital immatériel que sont le capital structurel, le capital humain et le capital relationnel afin de rassurer les prêteurs.

D'ailleurs, son étude a fait ressortir que ces entreprises communiquent davantage sur le capital humain. Néanmoins, il s'avère opportun de s'interroger sur la pertinence de ces informations non financières relatives au capital immatériel divulguées volontairement dans les rapports annuels par les

entreprises pour les investisseurs sur le marché financier (Maaloul et Zéghal (2015)). D'où, nous formulons la question suivante : comment le marché financier valorise-t-il le capital immatériel ? De cette question principale, il s'ensuit les questions secondaires suivantes :

- Comment le marché financier valorise-t-il le capital structurel ?
- Comment les informations communiquées sur le capital relationnel sont-elles valorisées par le marché financier ?
- Comment le marché financier évalue-t-il les informations communiquées que le capital humain ?

L'objectif de la présente recherche est d'analyser la valorisation des informations communiquées sur le capital immatériel par les investisseurs sur le marché financier.

Pour explorer notre problématique, cette recherche sera structurée en trois sections. D'abord, la première section fera, dans un premier temps, une synthèse de la littérature sur le concept du capital immatériel. Dans un second temps, cette section mettra en exergue les théories explicatives du capital immatériel comme source de création de valeur et de leur évaluation par le marché financier ainsi que leurs validations empiriques. Ensuite, la deuxième section explicitera la démarche méthodologique. Enfin, la troisième section sera vouée l'interprétation des résultats et à leur discussion.

1.   Revue de littérature

Dans l'imaginaire collectif, le capital immatériel représentant la face invisible de la richesse de l'entreprise est perçu comme un levier de création de valeur pour l'entreprise. Il s'ensuit que, son importance dans le processus de création de richesse des entreprises a suscité plusieurs débats théoriques et empiriques.

1.1   Le capital immatériel, un débat conceptuel

Le survol de la littérature relative au capital immatériel met en exergue plusieurs définitions du capital immatériel sans aboutir à une définition universellement admise (Anaya (2021)). Le terme "capital immatériel" est souvent utilisé de manière interchangeable avec le terme "capital intellectuel" dans la littérature. Ces termes font référence à des actifs de l'entreprise qui ne sont pas physiquement tangibles, tels que les connaissances, les compétences, les relations avec les clients, la propriété intellectuelle, etc. Ils sont également décrits comme des actifs incorporels ou intangibles. Cependant, ces termes sont utilisés indifféremment selon Bessieux-Ollier et walliser (2010).

Selon Stewart (1997), le capital immatériel désigne l'ensemble des ressources intangibles d'une organisation qui contribuent à sa valeur économique. Ces ressources comprennent les compétences, les connaissances,

la réputation, la culture d'entreprise, les brevets et les marques. Cette définition proposée par Stewart (1997) fait ressortir l'utilité des actifs immatériels dans la création de valeur pour une entreprise. Elle souligne que les compétences et les connaissances des employés, ainsi que la réputation et la culture d'entreprise, peuvent jouer un rôle crucial dans le succès et la performance économique d'une organisation. De plus, cette définition inclut également les actifs de propriété intellectuelle tels que les brevets et les marques. Ces actifs peuvent conférer à une organisation un avantage concurrentiel en protégeant ses innovations et en créant une reconnaissance et une fidélité des clients.

Quant à Edvinsson et Malone (1997), le capital immatériel représente les actifs incorporels d'une entreprise, tels que les compétences des employés, les relations avec les clients, la propriété intellectuelle et les systèmes d'information. Ces actifs immatériels contribuent à la création de valeur et améliorent la performance globale de l'organisation. Cette définition souligne l'importance des ressources intangibles dans la réussite d'une entreprise. Les compétences des employés, par exemple, comprennent leurs connaissances, leurs expériences et leurs capacités à innover. Ce qui peut se traduire par un avantage concurrentiel pour l'organisation. Les relations avec les clients jouent également un rôle clé, car une base solide de clients fidèles peut générer des revenus récurrents et contribuer à la réputation de l'entreprise. En outre, la propriété intellectuelle, telle que les brevets, les marques et les droits d'auteur, permet de protéger les innovations et les créations de l'entreprise, renforçant ainsi sa position sur le marché. Les systèmes d'information efficaces et adaptés peuvent améliorer les processus internes, la prise de décision et la gestion des connaissances, favorisant ainsi la performance organisationnelle.

Contrairement à Stewart (1997), cette définition met en évidence la nature incorporelle du capital immatériel et souligne le rôle essentiel des compétences, des relations avec les clients, de la propriété intellectuelle et des systèmes d'information dans la création de valeur et la performance globale d'une entreprise. Selon Bontis (1998), le capital immatériel représente l'ensemble des connaissances, compétences, talents, informations, relations et autres actifs intangibles d'une organisation qui contribuent à la création de valeur économique et sociale. Cette définition met en avant la nature intangible du capital immatériel et souligne les différents éléments qui le composent. Les connaissances représentent l'ensemble des informations, des idées et des expériences accumulées au sein de l'organisation. Les compétences et les talents se réfèrent aux capacités spécifiques des employés et à leur savoir-faire. Les informations sont les données et les analyses pertinentes utilisées pour la prise de décision. Les relations désignent les liens et les collaborations avec les parties prenantes, tels que les clients, les fournisseurs et les partenaires. Enfin, les autres actifs intangibles peuvent

inclure des éléments tels que la réputation de l'entreprise, la culture organisationnelle et les processus internes.

Cette définition met en évidence l'importance des ressources intangibles dans la création de valeur, tant sur le plan économique que social. Elle souligne que ces actifs immatériels peuvent avoir un impact significatif sur la compétitivité, l'innovation, la performance financière et la réputation d'une organisation. Il ressort, de ces définitions, la reconnaissance du caractère intangible du capital immatériel qui contribue à la création de valeur économique pour l'organisation.

1.2   Le capital immatériel, un concept multidimensionnel

Au-delà de ce débat conceptuel portant sur le capital immatériel, en raison de son caractère protéiforme, le capital immatériel revêt plusieurs composantes. Selon Rgaguna et Hniche (2018), il existe effectivement différentes perspectives sur la décomposition du capital immatériel d'une organisation. Cependant, un consensus semble s'être formé autour de trois composantes principales : le capital humain, le capital structurel et le capital relationnel.

Le capital humain représente les connaissances, compétences et capacités des individus qui travaillent au sein d'une organisation. Il englobe l'éducation, la formation, l'expérience professionnelle, ainsi que les talents et les compétences spécifiques des employés. Le capital humain est considéré comme un élément clé de la valeur ajoutée d'une entreprise, car il peut influencer directement sa capacité à innover, à prendre des décisions et à s'adapter aux changements. Relativement au capital structurel, il fait référence aux actifs immatériels qui appartiennent à l'organisation elle-même et qui contribuent à sa performance. Il englobe les brevets, les marques déposées, les bases de données, les systèmes de gestion des connaissances, les procédures opérationnelles, les logiciels et autres ressources intellectuelles. Le capital structurel représente les processus, les structures et les systèmes qui soutiennent les activités de l'entreprise et contribuent à sa productivité et à son avantage concurrentiel. Quant au capital relationnel, il désigne les relations, les réseaux et les liens que l'entreprise entretient avec ses clients, ses fournisseurs, ses partenaires commerciaux, ses actionnaires et d'autres parties prenantes. Il intègre la confiance, la réputation, les alliances stratégiques et la capacité de l'organisation à collaborer et à tirer parti de ces relations. Le capital relationnel est considéré comme un élément clé de la création de valeur à long terme et de la pérennité de l'entreprise.

Ces trois composantes, le capital humain, le capital structurel et le capital relationnel, sont souvent considérées comme interdépendantes et complémentaires. Elles contribuent collectivement à la création de valeur et à la performance globale de l'organisation.

1.3   La théorie des ressources et capital immatériel

La théorie des ressources de Barney, développée par Jay Barney en 1991, est un cadre théorique largement reconnu dans le domaine de la stratégie d'entreprise. Bien que la théorie des ressources de Barney ne traite pas directement du concept spécifique du capital immatériel, elle fournit des bases conceptuelles importantes pour comprendre la manière dont les ressources, qu'elles soient tangibles ou intangibles, peuvent contribuer à l'avantage concurrentiel d'une organisation. Selon la théorie des ressources de Barney, les ressources d'une entreprise peuvent être une source de différenciation stratégique durable et d'avantage concurrentiel si elles satisfont aux critères de valeur, de rareté, d'imitabilité et d'exploitabilité (VRIO). Les ressources qui répondent à ces critères peuvent permettre à une entreprise de réaliser des performances supérieures à celles de ses concurrents.

Dans le contexte du capital immatériel, la théorie des ressources de Barney (1991) met en évidence l'importance des ressources intangibles, telles que les connaissances, les compétences, la culture organisationnelle, les relations avec les clients et les partenaires, qui peuvent être des sources de valeur et d'avantage concurrentiel pour une organisation. Précisément, cette théorie souligne que les entreprises doivent identifier et développer leurs ressources immatérielles uniques pour maintenir un avantage concurrentiel durable. Les ressources intangibles sont souvent plus difficiles à imiter que les ressources tangibles. Ce qui rend difficile pour les concurrents de reproduire le succès d'une entreprise qui a réussi à les développer de manière efficace. En investissant dans le capital immatériel et en comprenant comment exploiter ces ressources intangibles, les entreprises peuvent renforcer leur position sur le marché et assurer leur succès à long terme. Ainsi, la théorie des ressources de Barney peut être utilisée pour comprendre comment les composantes du capital immatériel, telles que le capital humain, le capital structurel et le capital relationnel, peuvent être considérées comme des ressources stratégiques qui contribuent à la performance et à l'avantage concurrentiel d'une entreprise.

1.4   La théorie du signal et évaluation du capital immatériel par le marché financier

La théorie du signal en finance fait référence à l'utilisation d'informations ou de signaux pour prendre des décisions d'investissement ou évaluer la valeur d'actifs financiers. Les signaux peuvent être des indicateurs économiques, des données financières, des événements spécifiques ou des informations provenant de diverses sources qui peuvent influencer les décisions des investisseurs. Dans le contexte des entreprises et du capital immatériel, cela signifie que les entreprises cherchent à envoyer des signaux qui reflètent fidèlement la valeur de leurs actifs intangibles aux parties prenantes telles que les investisseurs, les créanciers, les partenaires

commerciaux et les clients. Assurément, le caractère confidentiel du capital immatériel crée des situations d'asymétrie informationnelle entre les dirigeants d'entreprise et les investisseurs sur le marché financier (Bellalah et al. (2008)). Cette asymétrie d'informations complexifie l'évaluation du capital immatériel par le marché financier. Par ailleurs, cette situation crée une sous-évaluation des sociétés sur le marché financier par les investisseurs (Woolridge (1988) ; Chan et al. (1990) ; Lev et Sougiannis (1996) ; Chan et al. (2001) ; Eberhart et al. (2004)).

En conséquence, selon l'OCDE (2006), les sociétés cotées doivent fournir des informations utiles et suffisantes sur les immatériels dans l'optique d'améliorer les décisions des investisseurs et discipliner les dirigeants. Ce qui éviterait une sous-estimation de la valeur des titres sur le marché financier. Effectivement, la transparence dans la communication des informations sur le capital immatériel peut renforcer la confiance des investisseurs dans l'entreprise et dans les marchés financiers en général. En outre, la transparence dans la divulgation d'informations sur le capital immatériel a pour effet d'inciter les dirigeants à gérer ces immatériels de manière responsable et à adopter des pratiques qui renforcent la valeur de l'entreprise à long terme. Par ailleurs, Diamond et Verrecchia (1991) ont avancé l'argument selon lequel une divulgation accrue d'informations concernant le capital immatériel des entreprises peut réduire l'asymétrie d'information sur les marchés financiers. En fournissant davantage d'informations sur les actifs immatériels, tels que la réputation de la marque, les connaissances tacites, les relations clients, etc., les entreprises peuvent permettre aux investisseurs d'obtenir une vision plus claire de la valeur réelle de l'entreprise. Cette réduction de l'asymétrie d'information sur le capital immatériel pourrait contribuer à augmenter la liquidité des titres, et par conséquent la valeur boursière des entreprises.

1.5   Apports empiriques de l'évaluation du capital immatériel par le marché financier et formulation des hypothèses

L'évaluation du capital immatériel est souvent complexe et subjective. Toutefois, le capital immatériel joue un rôle essentiel dans la valorisation boursière des entreprises, en particulier en raison de son potentiel de croissance future, de son avantage concurrentiel, de sa réputation et de son capital humain. Les entreprises qui gèrent efficacement leur capital immatériel peuvent être perçues comme plus attractives par les investisseurs. Ce qui peut se traduire par une valorisation boursière plus élevée. C'est à juste titre qu'en raison de son rôle clé en tant que catalyseur de la création de valeur pour les entreprises, l'évaluation du capital immatériel par le marché financier a été au centre de discussions et de recherches à la fois théoriques et empiriques.

En effet, ces recherches trouvent leur origine dans la disparité observée entre la valeur comptable des entreprises cotées et leur valeur de marché sur

les marchés financiers. Cette différence est attribuée à l'absence de prise en compte du capital immatériel dans les états financiers. Depuis plusieurs décennies, différentes recherches ont porté un intérêt particulier sur les relations entre les immatériels et les marchés financiers aux Etats-Unis et d'autres contextes (Cazavan-Jeny (2004)). D'ailleurs, selon plusieurs études dont celles menées dans le contexte américain par Aboody et Lev (1993), Chan, Kensiger et Martin (1992) ainsi que Lev et Zarowin (1999) démontrent que les entreprises intensives en Recherche et Développement sont sous-évaluées par les investisseurs sur le marché financier. Dans le même contexte américain, Deng, Lev et Narin (1999) apportent la preuve de la valorisation du capital structurel par le marché financier en trouvant une association positive entre le ratio market to book, les rendements boursiers et les brevets. Ce résultat suggère que les investisseurs sur les marchés financiers américains accordent de l'importance aux actifs immatériels lorsqu'ils évaluent les entreprises.

Ces résultats corroborent les travaux de Megna et Klock (1993, 2000) ainsi que de Gleason et Klock (2006), lesquels mettent en évidence des corrélations notables et positives entre les éléments sélectionnés du capital immatériel des entreprises aux États-Unis et leur ratio Q de Tobin. Dans la même veine, sur la base d'un échantillon de 500 entreprises américaines observées sur une période de 5 ans de 1993 à 1997, Abdolmohammadi (2005) met en exergue une relation positive entre la divulgation d'informations sur le capital immatériel et la capitalisation boursière des entreprises. L'auteur constate une valorisation des informations communiquées sur le du capital immatériel par les entreprises américaines. Ces résultats obtenus dans le contexte américain confirment que le capital immatériel joue un rôle crucial dans la valorisation des entreprises aux États-Unis, et soulignent la nécessité pour les entreprises de mieux comprendre, évaluer et communiquer leurs actifs immatériels pour permettre aux investisseurs de prendre des décisions éclairées.

En revanche, dans le contexte européen, Moussu et Thibierge (1996), sur la base d'un échantillon de 1457 sociétés européennes, montrent que la valorisation du capital immatériel mesurée par le Q de Tobin n'est pas reliée aux actifs immatériels inscrits à l'actif du bilan, dans le contexte européen. Cela indique que le marché financier ne semble pas accorder une importance particulière aux actifs immatériels lorsqu'il valorise les entreprises européennes. Dans la même veine, Dammak (2015) examine la contribution du capital immatériel à l'évaluation des entreprises par le marché financier britannique. Sur la base de 71 rapports annuels d'entreprises multinationales observés en 2005, son étude indique que le capital immatériel est positivement valorisé par les investisseurs sur le marché financier. De plus, les investisseurs accordent plus d'importance au capital structurel. Cette divergence de résultats

des deux études pourrait être attribuable aux différences relatives à la règlementation comptable en matière de comptabilisation des immatériels. Cette absence de relation entre les investissements immatériels et le Q de Tobin a été trouvée sur le marché financier marocain par El Barrouz et Chakhat (2022). Par ailleurs, dans le contexte français, une recherche similaire menée par Cazavan-Jeny en 2004 sur un échantillon de 63 sociétés françaises cotées a révélé l'existence d'un lien significatif entre le goodwill et le ratio market-to-book. Cependant, cette étude n'a pas réussi à mettre en évidence de lien significatif avec les immatériels passés en charge. Cela suggère que le goodwill est étroitement lié à la valorisation de l'entreprise par rapport à sa valeur comptable, tandis que les immatériels passés en charge n'ont pas montré de corrélation significative avec ce ratio. En effet, l'étroite relation observée entre le goodwill et le ratio market-to-book sur le marché français par l'auteur suggère que les éléments immatériels issus des écarts d'acquisitions peuvent exercer une influence significative sur la perception de la valeur de l'entreprise.

En revanche, l'absence de corrélation significative avec les immatériels passés en charge met en évidence les défis inhérents à l'évaluation et à l'intégration de ces éléments dans le processus d'évaluation financière. Au demeurant, les travaux réalisés par Matoussi et Zemzem (2010) apportent la preuve de la valorisation positive des investissements immatériels activés des entreprises du secteur automobile par le marché financier français, contrairement aux travaux de Thibierge (1997) et Cazavan-Jeny (2004). Une autre étude a été réalisée par Chen, Cheng & Hwang (2005) dans le contexte taiwanais portant 4254 observations de 1992 à 2002 en vue d'appréhender l'influence des composantes du capital immatériel sur la valeur de marché des entreprises mesurée par le ratio market to book. Il ressort de leur étude que les composantes du capital immatériel sont valorisées positivement mais différemment par le marché financier.

D'ailleurs, leur étude décèle que le capital structurel a une meilleure perception par le marché financier que les autres composantes. Ces observations soulignent l'importance cruciale d'une communication transparente concernant les actifs immatériels, ainsi que l'élaboration de méthodes d'évaluation adéquates afin de mieux refléter leur contribution effective à la valeur globale de l'entreprise. Dans le contexte africain, plus précisément dans le contexte tunisien, Bellalah, Bouri et Chabchoub (2008), à partir d'un échantillon de 21entreprises tunisiennes cotées à la Bourse de Valeurs Mobilières de Tunis cotées sur la période 2002-2004, montrent que les investissements immatériels activés sont valorisés par les investisseurs sur le marché financier. D'ailleurs, cette valorisation positive des immatériels par le marché financier marocain est soutenue par les travaux de El Barrouz et Chakhat (2022). Toutefois, dans une étude réalisée sur le Marché Financier

Régional, Ossonon (2017) apporte la preuve de la valorisation négative des investissements immatériels par les investisseurs. Ces résultats contradictoires illustrent la complexité inhérente à la valorisation des investissements immatériels sur les marchés financiers. Ils soulignent également l'impact de divers facteurs, tels que la culture, les conditions économiques et les réglementations locales, sur la manière dont les investisseurs perçoivent et évaluent les actifs immatériels.

Sans être exhaustive, la synthèse de la littérature empirique relative à l'évaluation du capital immatériel par le marché financier met en relief d'une part, une approche plus globale du capital immatériel et d'autre part, une approche partielle du capital immatériel, à l'exception des travaux de Dammak (2015). En fait, Dammak (2015) a étudié la valorisation de chaque composante du capital immatériel par le marché financier britannique. A l'instar des travaux de Dammak (2015), Cette étude se distingue de manière fondamentale des travaux menés par Ossonon en 2017 sur le marché financier régional. Dans son étude, Ossonon (2017) a principalement examiné les investissements immatériels activés ou les actifs incorporels qui représentent la partie financière du capital immatériel présente dans le bilan.

En revanche, l'approche adoptée dans cette étude va au-delà en incorporant les informations extra-financières relatives au capital immatériel publiés dans les rapports annuels que sont le capital structurel, le capital humain et le capital relationnel selon la typologie de Bontis et al (2000). En effet, la présente étude adopte une approche plus complète en incluant les informations extra-financières liées au capital immatériel qui englobent également des aspects tels que le capital structurel (les ressources et les processus internes de l'entreprise), le capital humain (les compétences et les connaissances des employés) et le capital relationnel (les relations avec les parties prenantes externes). Cette approche plus large permet de mieux d'appréhender la contribution de chacune des composantes du capital immatériel à la création de valeur des entreprises.

Suivant les présomptions de la théorie des ressources et de la théorie du signal ainsi que les conclusions des travaux d'Abdolmohammadi (2005), celles de Gleason et Klock (2006) ainsi que les travaux de Dammak (2015) nous présumons :

H_0 : Le marché financier valorise positivement le capital immatériel

L'examen de la littérature relative à la conceptualisation du capital immatériel a permis de voir plusieurs typologies du capital immatériel en raison de son caractère protéiforme. Cependant, dans le contexte de notre recherche, la classification de Bontis et al (2000) est retenue. En effet, Bontis et al (2000) décompose le capital immatériel en trois catégories que sont le

capital structurel, le capital relationnel et le capital humain. En conséquence, nous formulons les hypothèses suivantes :

H_1-les informations divulguées sur le capital structurel sont positivement valorisées par le marché financier

H_2-les informations publiées sur le capital relationnel sont positivement valorisées par le marché financier

H_3 -les informations communiquées sur le capital humain sont positivement valorisées par le marché financier

2-   Méthodologie de la recherche

Après un survol de la littérature inhérente à l'évaluation du capital immatériel par le marché financier, cette section aborde la méthodologie adoptée pour tester nos hypothèses. Nous décrirons la démarche méthodologique suivie, incluant la sélection de l'échantillon et la collecte des données, ainsi que les variables de l'étude et leur mesure. En outre, nous exposerons le modèle d'étude ainsi que les méthodes pour l'analyse des données.

2.1 Sélection de l'échantillon et collecte des données

Initialement, toutes les sociétés cotées à la BRVM au 31 décembre 2018 faisaient partie de l'échantillon. Après avoir éliminé les sociétés financières, celles ne produisant pas de rapports annuels et celles ne communiquant pas sur leur capital immatériel dans leurs rapports, un échantillon final de 20 sociétés non financières a été retenu. Ces 20 sociétés non financières étaient celles qui communiquaient sur leur capital immatériel dans leurs rapports annuels.

Les rapports annuels des entreprises incluses dans l'échantillon ont été collectés à partir du site web de la BRVM. La période étudiée correspond à l'exercice comptable de 2018, et les rapports annuels recueillis concernent cette année spécifique. L'analyse de la communication d'informations sur le capital immatériel et ses composantes a été basée sur l'observation d'une seule année, en tenant compte de la stabilité de la politique de communication des entreprises dans le temps (Ding et Stolowy (2003) ; Gandia (2003) ; Sonnier et al. (2007)).

2.2   Choix des variables

Pour examiner la valorisation du capital immatériel par le marché financier, nous étudions l'association entre la valorisation boursière du capital immatériel et ses différentes composantes que sont le capital structurel, le capital humain et le capital relationnel.

2.2.1 Variable à expliquer : la valorisation du capital immatériel

Face à la déficience de la comptabilité à intégrer le capital immatériel efficacement dans les états financiers, afin de fournir des données crédibles aux investisseurs, certains chercheurs comme Stewart (1997) ont élaboré des indicateurs de mesure du capital immatériel en se basant sur l'évaluation faite par le marché (Aâmoum et Saki (2021)). Spécifiquement, ces auteurs mesurent la valorisation du capital immatériel par la différence ou le rapport entre la valeur de marché d'une entreprise et la valeur de ces capitaux propres. Effectivement, Aboody et Lev (1993), Chan, Kensiger et Martin (1992) ainsi que Lev et Zarowin (1999) prouvent l'existence d'une association entre le capital immatériel et le Q de Tobin. Cette mesure de la valorisation du capital immatériel par le marché financier a été également utilisée dans le contexte européen par Moussu et Thibierge (1996) et. Dans une étude portant sur l'évaluation du capital immatériel par le marché financier marocain, Taouab, Benazzou et Babounia (2016) adopte l'écart entre la capitalisation boursière et les dettes financières avec la valeur de l'actif économique pour appréhender la valorisation du capital immatériel par les investisseurs. Dans le contexte tunisien, Bellalah, Bouri et Chabchoub (2008) ont eu recours au Q de Tobin pour mesurer la valorisation du capital immatériel par le marché financier, tout comme, l'étude réalisée par Ossonon (2017) sur le marché financier régional et El Barrouz et Chakhat (2022) dans le contexte marocain.   Toutefois, dans le contexte français, Cazavan Jeny (2004) évalue la reconnaissance des immatériels par le ratio market to book. D'ailleurs, conformément à l'étude de Cazavan-Jeny (2004), dans le contexte taiwanais, cette mesure a été utilisée dans les travaux de Chen, Cheng et Hwang (2005).

Dans le cadre de cette recherche, comme Cazavan-Jeny (2004) et Chen et al (2005), nous retenons le ratio market to book pour mesurer la valorisation du capital immatériel par les investisseurs sur le marché financier régional. Ce ratio est déterminé par le rapport entre la capitalisation boursière et la valeur comptable des capitaux propres.

2.2.2 Variables explicatives

Cette recherche vise à étudier l'association entre la valorisation du capital immatériel par le marché financier et ses composantes que sont le capital structurel, le capital humain et le capital relationnel selon la décomposition de Bontis et al (2000). Pour mesurer le capital immatériel et ses composantes, nous fondons notre analyse sur la quantité d'informations divulguées dans les rapports annuels des entreprises incluses dans notre échantillon. Ainsi, comme Ossonon (2022), Aâmoum et Guati, 2016), Agbodjo (2015) et Beldi et al (2014), nous avons choisi d'utiliser le nombre de mots comme unité d'analyse. En se référant à la grille de Campbell et Rahman (2010) adaptée par Beldi et al (2014) (voir tableau n°1), pour chaque document de référence, nous avons

entrepris de repérer les termes associés au capital immatériel. En additionnant les occurrences de mots dans chaque catégorie du capital immatériel, nous avons calculé le nombre total de mots liés à ce concept et à ses composantes. Ainsi, les composantes du capital immatériel que sont le capital structurel, le capital relationnel et le capital humain représentent les variables d'intérêt.

Score Capital immatériel= Nombre total de mots sur le capital structurel +Nombre total de mots sur le capital relationnel + Nombre total de mots sur le capital humain

Score capital structurel = le rapport entre la somme des mots publiés sur chacun des items du capital structurel et le score du capital immatériel

Score capital relationnel = le rapport entre la somme des mots publiés sur chacun des items du capital structurel et le score du capital immatériel

Score capital humain = le rapport entre la somme des mots publiés sur chacun des items du capital structurel et le score du capital immatériel

De plus, dans le cadre de notre analyse, nous intégrons des variables de contrôle, parmi lesquelles figurent l'endettement qui est calculé comme le rapport entre les dettes financières et les capitaux propres ainsi que la taille de l'entreprise qui est mesurée en utilisant le logarithme du chiffre d'affaires.

Tableau n° 1- Les composantes du capital immatériel et les items

Capital Structurel	Capital Relationnel	Capital Humain
Vision, mission, code d'éthique, code de conduite, code des pratiques, principes de fonctionnement, le motif d'arrangement, manuel des procédures, guide, Création de la valeur aux actionnaires, soutenir la croissance, écouter les clients, protection de l'environnement, solidarité de la société, penser, croire, estimer, croyance générale de l'entreprise, Contrôle des stocks, contrôle de la qualité, évaluation de la performance, système, procédure, processus, méthode ou technologie utilisés par l'entreprise, réseau informatique, base de données, logiciels, réseau, matériel, intranet, serveur, Channel de communication, informatique, chaîne de communication, canal de communication, plate-forme, site, Infrastructure Portefeuille de propriétés, la modernisation et rénovation des magasins, extension, sécurité, machine, immobilisation	Relations monétaires favorables, fournisseurs, relations avec les actionnaires, banquiers, fournisseurs de fonds, crédits, investissements, marque, sous-marque, marque de fabrique, gamme de produit, nom du service, parts de marché, prix (suite à un classement) accordés à des produits, gage de satisfaction, consommateurs, fidélité des clients, confiance, services accordés, satisfaction, nombre des consommateurs (clients), segmentation des clients, commodité des clients, plus de facilités, chaîne d'approvisionnement, logistique, réseau d'affaires, développement de nouveaux magasins à travers les régions, système de livraison, études de marché, vente en ligne, brochure, catalogue, activités de promotion, stratégies de promotion, bureau de liaison, marketing, publicité, chaînes de	Employés, personnel, profil du personnel, bonus, équité, égalité, relation avec le personnel, sécurité du personnel, payement, rémunération, devoirs et droits, morale, attitude, bien-être, récompense, personnel qualifié, motivation, recrutement, embauche, fidélisation, responsabilités. Formation, développement professionnel, carrière, programme d'initiation, recrutement, programme d'assistance, éducation du personnel, stage, amélioration des compétences, formation interne, formation continue, éducation, bachelier, niveau éducatif, doctorat, qualification personnelle, cadre, ancienneté, expérience, compétence, priorité, spécialisation, savoir-faire, connaissances liées au travail, innovation, création, développement de nouveaux produits, recherche et

| corporelle à long terme, infrastructure, usines. | distribution, franchise, octroi de licences, licencier, collaboration, sous-traitance, fournisseurs, gouvernement, autorités locales, médias, la presse, consultant, expert externe, coopération, responsabilités mutuelles, relations externes, partenariat d'affaires, réputation, parrainage, implication communautaire, mesures de protection de l'environnement, responsabilité sociale, contrat favorable, actions humanitaires, activités (sportives…), conférence, mécénat, fondation. | développement, nouvelle technologie, stratégie marketing créative, nouvelle ligne de produit, nouveaux secteurs. |

Source : Beldi et al (2014, p.120)

2.3 Modèle de l'étude et méthodes d'analyse

Afin de conduire une analyse empirique visant à évaluer la valorisation du capital immatériel par le marché financier, nous explorons la relation entre le ratio market to book et les informations divulguées relatives aux composantes du capital immatériel que sont le capital structurel, le capital relationnel et le capital humain. Pour ce faire, nous employons un modèle de régression linéaire multiple, formulé comme suit :

$$RMB_i = \beta_0 + \beta_1 SCS_i + \beta_2 SCR_i + \beta_3 SCH_i + \beta_4 END_i + \beta_5 TAIL_i + \varepsilon_i$$

Avec :

RMB_i : Ratio Market to Book mesurant la valorisation du capital immatériel par le marché financier

SCM_i : Score total d'informations publiées sur le capital immatériel par l'entreprise i

SCS_i : Score d'informations publiées sur le capital structurel par l'entreprise i

SCR_i : Score d'informations publiées sur le capital relationnel par l'entreprise i

SCH_i : Score d'informations publiées sur le capital humain par l'entreprise i

END_i : Taux d'endettement de l'entreprise i

$TAIL_i$: Taille de l'entreprise i

Pour tester nos hypothèses de recherche, nous utilisons deux méthodes distinctes que sont l'analyse qualitative et l'analyse quantitative. Précisément, d'une part, l'analyse qualitative consistera en l'utilisation de l'analyse de contenu pour mettre en lumière l'étendue des informations divulguées concernant le capital immatériel et ses différentes catégories. D'autre part,

nous mettons en œuvre une analyse de régression linéaire multiple dans le but d'étudier le degré d'association entre le ratio market to book et les scores de divulgation d'informations sur les composantes spécifiques du capital immatériel.

3. Résultats et discussion

Dans cette section, nous présenterons les résultats des analyses statistiques et économétriques obtenus à partir des données collectées dans les rapports annuels et les états financiers de 20 entreprises cotées sur le marché financier régional. En outre, ces résultats feront l'objet de discussion au regard des résultats des travaux antérieurs inhérents à l'évaluation du capital immatériel par le marché financier.

3.1 Résultats
3.1.1 Résultats des statistiques descriptives

Les statistiques sommaires sur chacune des variables de l'étude (moyenne, écart-type, étendue) présentées dans le tableau n°2 dénotent qu'en moyenne la valorisation du capital immatériel (RMB) par le marché financier est de 3,026 avec un minimum de 0,006 et un maximum de 12,037. Quant au score d'informations publiées sur le capital structurel, sa moyenne est de 0,364 par entreprise avec une dispersion de 0,167. Concernant le score d'informations sur le capital relationnel, il affiche une moyenne de 0,229, et celle du capital humain est de 0,407. Par ailleurs le taux d'endettement moyen des entreprises s'établit à 1,206 et la taille moyenne des entreprises est de 10,928. Il ressort de l'analyse des statistiques descriptives qu'en moyenne les entreprises de notre échantillon publient plus d'informations sur le capital humain que le capital structurel et le capital relationnel.

Tableau n°2-Statistiques sommaires

Variable	Obs	Moyenne	Ecart-type	Min	Max
RMB	20	3,026	3,023	0,006	12,037
SCS	20	0,364	0,167	0,083	0,750
SCR	20	0,229	0,098	0,058	0,500
SCH	20	0,407	0,138	0,050	0,720
END	20	1,206	3,028	0,045	13,643
TAIL	20	10,928	0,676	9,144	12,009

Source : Auteur, à partir des données de la BRVM

Avec :

RMBi : Ratio Market to Book mesurant la valorisation du capital immatériel par le marché financier

SCMi : Score total d'informations publiées sur le capital immatériel par l'entreprise i

SCSi : Score d'informations publiées sur le capital structurel par l'entreprise i
SCRi : Score d'informations publiées sur le capital relationnel par l'entreprise i
SCHi : Score d'informations publiées sur le capital humain par l'entreprise i
ENDi : Taux d'endettement de l'entreprise i
TAILi : Taille de l'entreprise i

3.1.2 Résultats de l'analyse bivariée

L'analyse bivariée présente les résultats de la corrélation de Pearson entre les différentes variables (voir tableau n°3). Selon les résultats, seulement le taux d'endettement de l'entreprise (END) a une relation linéaire significative et positive avec la variable dépendante (Ratio market to book) à savoir la valorisation du capital immatériel par le marché financier. Quant aux autres variables explicatives, la corrélation de Pearson avec la variable dépendante n'est pas significative. Ce qui signifie l'absence de relation linéaire. Effectivement, les scores d'informations publiées sur le capital structurel (SCR) et le capital humain (SCH) affichent une corrélation linéaire négative mais non significative avec le Ratio Market to Book (RMB) tandis que le score d'informations divulguées sur le capital structurel (SCS) et le ratio market to book (RMB) sont positivement linéairement corrélées bien que cette corrélation ne soit pas significative.

D'ailleurs, l'analyse bivariée a mis en exergue une corrélation négative significative entre le capital relationnel, le capital humain avec le capital structurel. Cette corrélation significative entre les composantes du capital immatériel, largement documentée dans la littérature, pourrait se justifier par l'interdépendance entre le capital structurel et le capital humain (Edvinsson et Sullivan, (1996)). Le capital structurel se réfère généralement aux ressources tangibles d'une entreprise, telles que les actifs matériels, les brevets et les procédures opérationnelles. En revanche, le capital relationnel concerne les actifs immatériels liés aux relations de l'entreprise, tels que la confiance des clients, les partenariats stratégiques et la réputation. Une corrélation négative peut indiquer que l'entreprise investit davantage dans l'un de ces domaines au détriment de l'autre. En outre, une entreprise peut choisir de se concentrer davantage sur la construction de relations et de réseaux. Ce qui pourrait diminuer son investissement dans les actifs tangibles. Par exemple, une start-up technologique peut mettre l'accent sur le développement de partenariats et de collaborations, ce qui pourrait réduire son investissement en actifs matériels. Cela pourrait se traduire par une corrélation négative entre le capital structurel et le capital relationnel. De plus, les entreprises à différents stades de leur cycle de vie peuvent avoir des besoins différents en termes de capital structurel et relationnel.

Les jeunes entreprises peuvent mettre l'accent sur la création de relations solides pour se développer rapidement, tandis que les entreprises matures peuvent investir davantage dans des actifs tangibles pour consolider leur position sur le marché. Par ailleurs, la forte corrélation négative observée entre le capital structurel et le capital humain pourrait être imputable à plusieurs facteurs tels que l'allocation des ressources, la stratégie de gestion d'entreprise, aux changements organisationnels et le cycle de vie des entreprises

Tableau n°3-Corrélation de Pearson entre les différentes variables

	RMB	SCS	SCR	SCH	END	TAIL
RMB	1,000					
SCS	0,294	1,000				
	(0,208)					
SCR	-0,015	-0,568***	1,000			
	(0,950)	(0,009)				
SCH	-0,347	-0,810***	-0,022	1,000		
	(0,134)	(0,000)	(0,926)			
END	0,729***	-0,040	0,110	-0,030	1,000	
	(0,000)	(0,868)	(0,644)	(0,899)		
TAIL	0,272	-0,129	0,174	0,033	0,155	1,000
	(0,246)	(0,587)	(0,464)	(0,889)	(0,515)	

Source : Auteur

Avec :

RMBi : Ratio Market to Book mesurant la valorisation du capital immatériel par le marché financier

SCSi : Score d'informations publiées sur le capital structurel par l'entreprise i

SCRi : Score d'informations publiées sur le capital relationnel par l'entreprise i

SCHi : Score d'informations publiées sur le capital humain par l'entreprise i

ENDi : Taux d'endettement de l'entreprise i

TAILi : Taille de l'entreprise i

Note : Les p-value sont entre parenthèses ; ***, ** et * dénotent respectivement la significativité au seuil de 1%, 5% et 10%.

3.1.2 Résultats d'estimation

En raison de la forte corrélation entre le score d'informations sur le capital structurel (SCS) et le score d'informations liées au capital humain (SCH) détectée et pour éviter les problèmes de mutlicolinéarité entre les composantes du capital immatériel qui risqueraient d'introduire des biais dans l'estimation, deux modèles ont finalement été retenus : un modèle avec les variables Score d'informations sur le capital structurel (SCS) et Score

d'informations sur le capital relationnel (SCR) et un second modèle avec la variable Score d'informations divulguées sur le capital humain (SCH). Dans chacun de ces modèles les deux variables de contrôle que sont l'endettement (END) et la taille (TAIL) ont été rajoutées. Les deux modèles se présentent comme suit :

M1 : $RMB_i = \beta_0 + \beta_1 SCS_i + \beta_2 SCR_i + \beta_3 END_i + \beta_4 TAIL_i + \varepsilon_i$

M2 : $RMB_i = \beta_0 + \beta_1 SCS_i + \beta_2 END_i + \beta_3 TAIL_i + \varepsilon_i$

Selon les résultats d'estimation du modèle 1 consignés dans le tableau n°4, le R-carré est de 0,685. Ce qui traduit que 68,5% de la variabilité du ratio market to book (RMB) est expliqué par les variables explicatives que sont le score d'informations communiquées sur le capital structurel (SCS), le score d'informations publiées sur le capital structurel (SCR), l'endettement (END) et la taille des entreprises (TAIL). Le modèle est globalement significatif avec une F-stat de 86,99 et une p-value associée de 0,000. Le coefficient associé à SCS est de 7,356 et significatif au seuil de 5%. Cela signifie qu'une augmentation d'une unité du score d'information sur le capital structurel de l'entreprise implique une augmentation du ratio market to book de 7,356. L'endettement mesuré par le levier financier est aussi significatif et positif au seuil de 1% et son effet sur le RMB est chiffré à 0,702. En effet, les investisseurs sur le marché financier régional perçoivent l'endettement comme un catalyseur de la croissance future de l'entreprise qui contribuerait à amplifier le rendement des actionnaires. De ce fait, l'accroissement de la rentabilité financière pourrait se traduire par une importante valorisation boursière de l'entreprise.

Par ailleurs, la taille de l'entreprise influence positivement le RMB de l'entreprise au seuil de 10%, le coefficient associé étant de 0,885. Précisément, les entreprises de grande taille sont valorisées positivement par le marché financier en raison de la confiance accordée par les investisseurs du fait d'une grande visibilité de ces entreprises, leur réputation sur les marchés financiers ainsi que leur résilience. En outre, les investisseurs perçoivent ces entreprises comme étant capables d'exploiter des opportunités de croissance susceptibles de générer des bénéfices futurs pouvant influer positivement sur le ratio market to book. En revanche, le score d'informations lié au capital relationnel n'a pas d'influence sur la valorisation boursière des entreprises.

Tableau n°4-Résultats d'estimation du modèle avec SCS et SCR (modèle 1)

Variables	Coefficient	Erreur Standard Robuste	t-Stat	P-value
SCS	7,356**	3,200	2,300	0,036
SCR	3,218	1,863	1,730	0,105
END	0,702***	0,048	14,780	0,000
TAIL	0,885*	0,493	1,790	0,093
Constante	-10,900	5,509	-1,980	0,066
N	20			
F(4, 15)	86,990			
Prob > F	0,000			
R carré	0,685			
RMSE	1,909			

Source : Auteur

Note : *, ** et * dénotes respectivement la significativité au seuil de 1%, 5% et 10%.**

Avec :
Avec :
RMBi : Ratio Market to Book mesurant la valorisation du capital immatériel par le marché financier
SCSi : Score d'informations publiées sur le capital structurel par l'entreprise i
SCRi : Score d'informations publiées sur le capital relationnel par l'entreprise i
ENDi : Taux d'endettement de l'entreprise i
TAILi : Taille de l'entreprise i

Le tableau n°5 met en évidence les résultats du modèle 2 impliquant la variable score d'informations publiées sur le capital humain (SCH) et les deux variables de contrôle. Ce tableau dénote que le modèle n°2 est globalement significatif et affiche un pouvoir prédictif de 66,88%. De plus, les trois variables explicatives sont significatives avec l'endettement et la taille qui maintiennent un effet positif sur le Ratio market to book (RMB). Cependant, la régression indique que le score d'informations communiquées sur le capital humain (SCH) affecte négativement et significativement le Ratio Market to Book au seuil de significativité de 5%.

Tableau n°5-Résultats d'estimation avec SCH (modèle 2)

Variables	Coefficient	Erreur Standard Robuste	t-Stat	P-value
SCH	-7,282**	3,297	-2,210	0,042
END	0,691***	0,053	13,010	0,000
TAIL	0,788*	0,440	1,790	0,092
Constante	-3,451	4,600	-0,750	0,464
N	20			
F(4, 15)	93,63***			
Prob > F	0,000			
R carré	0,668			
RMSE	1,898			

Source : Auteur

Note : ***, ** et * dénotes respectivement la significativité au seuil de 1%, 5% et 10%.

Avec :

RMBi : Ratio Market to Book mesurant la valorisation du capital immatériel par le marché financier

SCHi : Score d'informations publiées sur le capital humain par l'entreprise i

ENDi : Taux d'endettement de l'entreprise i

TAILi : Taille de l'entreprise i

Des tests de validité sur les différents modèles estimés ont été effectués (voir tableau n°6) : test de nullité de la moyenne des résidus, test de normalité des résidus et enfin le test d'hétéroscédasticité. Le test de moyenne nulle est un test de Student. Pour la normalité, il s'agit du test de Skewness et kurtosis. En fixant un seuil de significativité de 1%, les résultats conduisent à l'acceptation de l'hypothèse nulle des différents tests de validité. En effet, toutes les p-value sont supérieures à 0,01. Ainsi, pour les deux modèles, l'hypothèse de moyenne nulle, l'hypothèse d'homoscédasticité (variance constante) et l'hypothèse de normalité des résidus sont validées au seuil de 1%.

Tableau n°6-Résultats des tests de validité

Tests		Modèle 1	Modèle 2
Test de moyenne nulle	t-Stat	0,000	0,000
	p-value	1,000	1,000
Test d'hétéroscédasticité	chi2(1)	0,250	0,160
	p-value	0,619	0,686
Test de normalité	Adj chi2(2)	4,150	6,250
	p-value	0,125	0,044

Source : auteur

3.2   Discussion des résultats

L'analyse de régression prouve que les informations communiquées sur le capital structurel influencent positivement la valorisation boursière des entreprises par les investisseurs sur le marché financier régional. Spécifiquement, les informations publiées concernant le capital structurel peuvent permettre aux investisseurs de mieux comprendre la valeur des actifs immatériels de l'entreprise. Lorsque les investisseurs ont une visibilité sur la manière dont l'entreprise exploite ses actifs immatériels pour générer des revenus et maintenir sa position concurrentielle, cela peut renforcer leur confiance dans la valeur à long terme de l'entreprise (Barney (1991)). Par ailleurs, la divulgation d'informations sur le capital structurel peut aider les investisseurs à mieux évaluer la valeur des actifs immatériels d'une entreprise. Lorsque les investisseurs comprennent comment l'entreprise tire profit de ses actifs immatériels pour générer des revenus et maintenir sa compétitivité, cela renforce leur confiance dans la valeur à long terme de l'entreprise.

En outre, les actifs immatériels tels que les brevets technologiques ou les marques solides peuvent conférer à une entreprise un avantage concurrentiel durable. Cette relation trouvée apporte la preuve empirique que les entreprises cotées sur le marché financier régional possèdent des actifs immatériels de qualité et les utilisent efficacement peut attirer des investisseurs à la recherche d'opportunités de croissance et de rentabilité à long terme. Une gestion judicieuse du capital structurel peut également indiquer la capacité de l'entreprise à innover et à se développer à l'avenir. Les investisseurs sont souvent intéressés par les entreprises qui investissent dans la recherche et le développement et qui disposent d'actifs intellectuels solides pour soutenir leur croissance future. Ce résultat trouvé sur le marché financier régional est conforme aux conclusions des travaux de Wang et Chang (2005) et de Dammak (2015). En effet, dans le contexte taiwanais, Wang et Chang (2005) ont trouvé un effet direct des composantes du capital immatériel sur la performance des entreprises, à l'exception du capital humain. Ce résultat valide mêmement les présomptions de la théorie du signal car les investisseurs perçoivent les informations publiées sur le capital structurel comme émettant un bon signal sur la qualité des projets ainsi que des performances futures des entreprises cotées sur le marché financier régional. En conséquence, l'hypothèse H_1 postulant que la divulgation d'informations sur le capital structurel influence positivement la valorisation boursière est validée.

Cependant, les résultats des estimations ont démontré que la communication d'informations sur le capital relationnel n'a aucune influence sur la valorisation boursière des entreprises. Cette absence de relation pourrait être imputable à plusieurs facteurs, entre autres, la complexité de la quantification de ces informations, le focus sur les données financières tangibles, l'horizon temporel court des investisseurs, la volatilité des marchés,

le manque de réglementation relative à la publication d'informations sur le capital immatériel et les préférences changeantes des investisseurs. Au regard de ce qui précède, l'hypothèse H_2 est infirmée.

D'ailleurs, l'analyse multivariée dénote que la publication d'informations sur le capital humain affecte négativement la valorisation boursière des entreprises cotées sur le marché financier régional. En fait, dans ce contexte, les entreprises qui communiquent davantage sur le capital humain sont valorisées de moins en moins par les investisseurs. Ces derniers n'appréhendent pas l'utilité de la politique de communication extensive sur le capital humain des entreprises. Ceux-ci peinent à intégrer la dimension humaine dans leurs décisions d'investissement, privilégiant davantage le capital structurel qui englobe des éléments plus concrets. Cette attitude des investisseurs pourrait s'expliquer par l'absence de reconnaissance comptable du capital humain, comme un facteur de création de valeur et de compétitivité des entreprises. Par ailleurs, d'autres facteurs, à savoir, le manque de visibilité des investissements en capital humain par les investisseurs, la vision myopique des investisseurs en matière d'horizon d'investissement ainsi que l'incertitude portant sur le capital humain.

Précisément, une entreprise qui investit fortement dans son capital humain, peut ne pas obtenir un retour sur investissement immédiat ou visible. Les investissements dans la formation, le développement des employés et l'amélioration des conditions de travail peuvent prendre du temps avant de se traduire par une augmentation des bénéfices. Par conséquent, les investisseurs pourraient percevoir ces dépenses comme des charges plutôt que comme des investissements, ce qui pourrait entraîner une diminution du ratio marché-valeur comptable (market to book) et ultimement conduire à une sous-évaluation du capital humain par les marchés financiers.

Dans cette perspective, il est possible d'interpréter la communication volontaire d'informations relatives aux ressources humaines comme une démarche visant à obtenir une reconnaissance sociale et à répondre aux attentes des parties intéressées (Kateb, 2014). Et pourtant, l'auteur El Altar (2016) avance l'argument selon lequel le capital humain joue un rôle crucial dans la génération de valeur au sein de l'entreprise, et qu'il représente l'un des facteurs déterminants majeurs de sa performance globale. Cette idée est également étayée par les affirmations de Zaiker (2023), qui soutient que le capital humain est une exigence fondamentale pour assurer la compétitivité des nations et promouvoir leur développement durable. Ce résultat obtenu sur le marché financier régional de l'UEMOA contredit les travaux de Chen et al (2005). D'ailleurs, il valide les conclusions des travaux de Kateb (2014) dans le contexte marocain et celles de Williams et Firer (2003) dans le contexte singapourien.

Conclusion

Depuis plusieurs décennies, le capital immatériel est devenu le moteur principal de la croissance des entreprises. En dépit de la dématérialisation croissante de la politique d'investissement des entreprises au fil du temps, la comptabilité ne mesure que partiellement l'immatériel. En conséquence, cette lacune de la comptabilité relativement à la reconnaissance comptable par les normalisateurs comptables du capital immatériel complexifie leur évaluation ainsi que celle des entreprises (Casta, Ramond et Escaffre (1997)). Pour se faire, en l'absence de réglementation qui contraint les entreprises à communiquer sur leur capital immatériel (capital structurel, capital relationnel et capital humain), ces dernières doivent nécessairement divulguer des informations pertinentes et suffisantes aux investisseurs sur leurs investissements en immatériels pour une meilleure évaluation de leurs titres par le marché financier. C'est ainsi que tout au long de cette étude, nous avons analysé la valorisation du capital immatériel par le marché financier.

En ayant recours à un échantillon de 20 entreprises cotées à la Bourse Régionale des Valeurs Mobilières (BRVM), l'analyse multivariée dénote que les informations communiquées sur le capital structurel sont positivement valorisées par les investisseurs sur le marché financier régional. En revanche, en dépit de la politique de communication intensive des entreprises cotées sur les savoir-faire, les expériences, les motivations, les formations, les connaissances, les qualifications des employés etc., les investisseurs n'appréhendent pas ces informations comme étant des facteurs de création de valeur et de compétitivité des entreprises. En conséquence, les informations divulguées sur le capital humain sont valorisées négativement par le marché financier. Précisément, les investisseurs sur le marché financier régional sanctionnent les entreprises qui divulguent plus d'informations sur le capital humain. Ces derniers ne perçoivent donc pas le capital humain comme une source de création de richesse pour les entreprises. Quant au capital relationnel, sa communication n'a aucune influence sur la valorisation boursière des entreprises cotées à la BRVM. D'ailleurs, cette recherche contribue à enrichir la littérature relative à l'évaluation des informations extra financières communiquées sur le capital immatériel par le marché financier.

Eu égard aux conclusions de cette recherche empirique, les dirigeants d'entreprise cotées doivent communiquer davantage des informations pertinentes et suffisantes aux investisseurs sur le marché financier sur les différentes composantes du capital immatériel pour une meilleure valorisation de leurs titres. Afin d'apporter une preuve empirique de la contribution du capital immatériel à la création de richesse des entreprises dans l'optique d'éviter la sous-évaluation de leurs titres, une recherche ultérieure pourrait explorer sur plusieurs années l'impact du capital immatériel sur la performance financière à travers la méthode VAIC (*Value Added Intellectual*

Capital). Par ailleurs, en raison de la forte corrélation entre les composantes du capital immatériel mise en exergue par l'analyse bivariée, une autre recherche pourrait recourir à la méthode des équations structurelles pour cerner les interactions entre les composantes du capital immatériel et leur impact sur la création de valeur.

Conflits d'intérêt: Il n'existe aucun conflit d'intérêt.

Déclaration de financement: Cette recherche n'a bénéficié d'aucun financement.

Disponibilité des données: Les résultats d'estimation proviennent de la régression des données comptables collectées dans les états financiers des entreprises cotées à la Bourse Régionale des Valeurs mobilières (BRVM). En plus, les données sur le capital immatériel sont issues des rapports annuels publiés. Les états financiers et les rapports annuels sont disponibles à l'adresse suivante : https://www.brvm.org/fr/rapports-societes-cotees.

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L'Utilisation des TIC Favorise-t-Elle l'Innovation ? Le Cas des Entreprises Industrielles Marocaines

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Résumé
Cet article examine l'effet de l'utilisation des technologies de l'information et de la communication (TIC) sur l'innovation en introduisant une variété de types de TIC. Nous utilisons les données portant sur un échantillon représentatif de 524 entreprises industrielles marocaines. Nos résultats montrent que l'utilisation des TIC a un effet positif sur la probabilité d'innovation d'une entreprise. Cet impact est différencié selon le type d'innovation et la nature des technologies introduites. Exception faite de la connexion à Internet qui présente un effet positif sur les deux types d'innovation, il apparait que la probabilité que les entreprises industrielles innovent en produit dépend positivement de l'utilisation de machines à commandes numériques alors que la probabilité d'innover en procédé est d'autant plus élevée si elles ont recours à la gestion assistée par ordinateur et aux robots. En outre, nous avons montré que les entreprises qui ont un usage intensif des TIC sont plus enclines à innover en produits et en procédés que celles qui utilisent peu ou pas de TIC.

Mots-clés: Innovation de produit – Innovation de procédé – Technologies de l'information et de la communication – Probit Bivarié

Does the Use of ICT Promote Innovation? The Case of Moroccan Industrial Compagnies

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Abstract
        This article examines whether the use of information and communication technologies (ICTs) has an effect on innovation by introducing a variety of types of ICTs. We use data from a representative sample of 524 Moroccan manufacturing firms. Our results show that the use of ICTs has a positive effect on the firm's probability to innovate. This impact is differentiated according to the type of innovation and the nature of the technologies introduced. Except for the connection to the Internet, which has a positive effect on both types of innovation, it appears that the probability that manufacturing firms innovate in product positively depends on the use of numerically controlled machines, whereas the probability of introducing process innovations is even greater if they use computer-assisted management and robots. Furthermore, we have shown that firms that are ICT-intensive are more likely to introduce in product and process innovations than those that use little or no ICTs.

Keywords: Product innovation, process innovation, ICT, bivariate probit model

1.   Introduction

        Si dans la théorie néoclassique le changement technologique est exogène, les économistes de la croissance endogène considèrent que les TIC stimulent la croissance économique à travers la création de nouveaux produits, procédés et modèles économiques (Czernich et al., 2011). Les TIC développent la croissance économique par le biais de trois principaux canaux (Vu et al. 2020): premièrement à travers l'apprentissage, la diffusion des technologies et l'innovation ; deuxièmement par la qualité de la prise de décision ; et enfin via la baisse des coûts et l'élargissement des choix permettant de pousser vers la droite les courbes d'offre et de demande à la fois.

Nous avons choisi dans cet article de nous focaliser sur le premier canal et plus particulièrement l'innovation.

Avec la numérisation croissante de l'économie, plusieurs recherches ont tenté d'examiner la contribution des technologies de l'information et de la communication à l'innovation. Celles-ci sont supposées faciliter la coordination entre les acteurs, réduire les coûts de transaction, améliorer les procédés et permettre de réaliser d'importants gains d'efficacité (Koellinger, 2005). Certains auteurs qualifient les TIC de technologies d'application générale dans la mesure où elles transforment radicalement les relations économiques et créent de nouveaux services et marchés. Selon Bresnahan et Trajtenberg (1996), ces technologies présentent trois caractéristiques : elles se répandent dans l'ensemble des secteurs, elles s'améliorent avec le temps diminuant le coût de leurs utilisateurs et rendent l'activité d'innovation plus aisée.

Le Maroc a placé les technologies de l'information au centre de sa stratégie de développement dès le début des années 2000. Très tôt, les décideurs politiques ont considéré l'information comme l'un des principaux facteurs de production de la valeur ajoutée après le capital et le travail de telle sorte qu'une utilisation efficace des technologies de l'information était à même d'assurer une croissance et une compétitivité durables (Ministère de l'industrie, du commerce et des nouvelles technologies, 2013). Ainsi plusieurs stratégies se sont succédées. La première stratégie, appelée E-Maroc 2010, avait pour ambition d'aider le Maroc à réaliser un bond en avant grâce au développement de l'économie du savoir et ce, de deux manières : la réduction de la fracture numérique et le positionnement du Maroc au niveau international dans le secteur des TIC (Ministère des affaires économiques et générales, 2007). C'est dans ce cadre que plusieurs technopôles et pôles de croissance ont été créés en regroupant sur un même territoire différents acteurs fédérés autour d'objectifs communs. A partir de 2009, c'est la stratégie *Maroc Numeric 2013* qui a été mise en œuvre. Plusieurs actions en lien avec les entreprises ont été menées telles que le programme Moussanada[1], le programme Infitah[2] et le programme RAWAJ TI[3](Ministère de l'industrie, du commerce et des nouvelles technologies, 2013). Par la suite, le Maroc a adopté la stratégie *Maroc Digital 2020* qui différait de la précédente stratégie dans le sens où elle se focalisait sur peu de projets mais à fort impact

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[1] Incitation financière des entreprises à moderniser leur système d'information.
[2] Formation offerte au profit des entreprises à l'issue de laquelle les entreprises participantes obtiennent un permis numérique leur donnant accès à un pack subventionné à hauteur de 30% par l'Etat. Ce dernier comprend un ordinateur, un logiciel de gestion commerciale intégrée et un abonnement Internet de 12 mois
[3] Modernisation des commerces de proximité grâce à une subvention de 75% d'une caisse enregistreuse et d'un logiciel commercial

transformationnel[4] (Ministère de l'industrie, du commerce et des nouvelles technologies, 2016). Ainsi, dans son volet relatif aux entreprises, cette stratégie avait comme objectif de connecter 20% des PME à Internet et d'augmenter le nombre de professionnels IT formés au Maroc. La dernière stratégie en date a été proposée en 2020 par l'agence du développement du digital. Elle comprend les orientations pour le développement du digital à l'horizon 2025 avec pour ambition de hisser le Maroc au rang de Hub digital et technologique de référence en Afrique. L'un des principaux axes de cette stratégie consiste en la mise en place d'un écosystème digital et technologique et la mise en œuvre d'un système d'innovation à travers l'accroissement des investissements en recherche et développement (Royaume du Maroc, 2020). Tous ces efforts consentis par l'Etat attestent de l'importance des TIC dans le développement du Maroc.

Bien que la relation entre utilisation des TIC et performance des firmes ait déjà fait l'objet de plusieurs recherches (Brynjolfsson et Hitt 2003 ; Cardona, 2013 ; Hollenstein, 2004), un nombre limité de travaux s'est intéressé à l'analyse du lien entre TIC et innovation. A notre connaissance, aucune étude empirique n'a été faite dans ce sens au Maroc. Notre étude est ainsi originale à plus d'un titre. D'une part, elle permet d'examiner le rôle des TIC en tant que catalyseur de l'innovation. D'autre part, elle met en lumière l'impact de différents types de TIC sur deux formes d'innovation : innovation de produit et innovation de procédé. En outre, très peu de recherches se sont penchées sur cette question dans le cadre de pays en développement.

Nous utilisons dans cet article les données de l'enquête du programme de recherche « Made in Morocco, industrialisation et développement » dont l'objectif est de faire un état des lieux de l'industrie marocaine en prenant en compte plusieurs aspects économiques tels quel le capital humain, l'exportation, le financement, l'innovation, etc. L'enquête a été administrée en face à face et porte sur un échantillon représentatif de 524 entreprises industrielles.

Cet article se structure de la façon suivante. Dans la section 2, nous présentons une revue de littérature empirique. La section 3 décrit les données et variables utilisées, fournit quelques statistiques descriptives et explique la méthodologie suivie. La section 4 présente les estimations économétriques et discute les principaux résultats. La dernière section conclut et propose des recommandations en termes de politiques publiques.

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[4] Modernisation des commerces de proximité grâce à une subvention de 75% d'une caisse enregistreuse et d'un logiciel commercial

2.   Revue de littérature et hypothèses

Cette section passe en revue les études antérieures portant sur l'impact de l'usage des TIC sur l'innovation. Il nous a semblé pertinent de répertorier ces études en deux catégories. La première analyse l'effet de l'usage de différentes formes de TIC sur l'innovation alors que la seconde explore comment un usage diversifié des TIC peut affecter l'innovation.

2.1.   L'effet de l'usage de différentes formes de TIC sur la probabilité d'innover

Plusieurs travaux empiriques ont essayé de mesurer l'impact de l'usage des TIC sur l'innovation dans les entreprises (Morikawa, 2004 ; Van Leeuwen, 2008 ; Higón, 2011 ; Spiezia, 2011 ; Ben Aoun et Dubrocard, 2012). Ces travaux s'accordent sur l'effet positif significatif des TIC sur la propension à innover mais avec des impacts différents selon les types d'innovation et les facteurs internes aux entreprises. Ainsi, en considérant l'utilisation des ordinateurs dans les firmes japonaises comme variable représentant les TIC, Morikawa (2004) a montré que ces dernières ont une plus grande probabilité d'innover. Ben Aoun et Dubrocard (2010) ont analysé la relation entre les TIC et l'innovation pour un échantillon d'entreprises luxembourgeoises. Une analyse en composantes multiples a permis d'établir des corrélations positives significatives entre les différents équipements TIC utilisés par les entreprises et leur capacité d'innovation. Leurs résultats suggèrent que les entreprises les plus intensives en TIC sont aussi celles les plus « intensives en innovation ». Selon elles, plus une entreprise est intensive en TIC plus elle aura tendance à innover. Cependant, les auteurs nuancent leur résultat en admettant que la propension à innover des entreprises ne semble dépendante que de certains équipements TIC ou combinaisons d'équipements. Sur un échantillon d'entreprises au Royaume-Uni, Higón (2011) a estimé l'impact de l'usage de différentes formes de TIC sur deux types d'innovation (produit et procédé) en utilisant un modèle de probit bivarié. Ses résultats indiquent que l'utilisation des TIC dans le processus de R&D (par exemple la conception assistée par ordinateur) et le développement d'un site web ont un effet positif sur les deux types d'innovation. L'utilisation d'applications générales sur ordinateur et des e-mails n'affecte que l'innovation de procédé. La première a un effet positif alors que la seconde a un effet négatif. Aux Pays-Bas, une étude menée par Van Leeuwen (2008) révèle que le E-commerce et l'utilisation du haut débit ont un impact significatif sur l'innovation produit et sur la productivité des entreprises. Dans le même ordre d'idées, Spiezia (2011), en exploitant des données portant sur huit pays de l'OCDE, appuie l'hypothèse selon laquelle les entreprises intensives en TIC sont plus à même à développer l'innovation de produit et l'innovation marketing aussi bien dans le secteur manufacturier que dans le secteur des services.

Polder et *al.* (2009) ont proposé une extension du modèle Crépon-Duguet-Mairesse (CDM) en y incluant des variables liées aux dépenses en recherche et développement (R&D) mais aussi l'investissement dans les TIC en tant qu'accélérateur potentiel de trois types d'innovation : l'innovation de produit, l'innovation de procédé et l'innovation organisationnelle. Leurs résultats empiriques démontrent l'existence d'une différence sectorielle quant à l'impact des TIC sur l'innovation aux Pays-Bas. L'investissement et l'utilisation des TIC, du haut débit et du commerce électronique ont un impact positif significatif sur les trois formes d'innovation dans le secteur des services. En revanche, cet impact est relativement limité dans le secteur manufacturier. Il dépend du type d'innovation et de l'usage des TIC. Dans les industries manufacturières, le E-commerce n'exerce d'effet positif que sur l'innovation de procédé. De même, les investissements en TIC et l'utilisation du haut débit se révèlent être des catalyseurs importants de l'innovation organisationnelle dans ce secteur. L'innovation de produit, quant à elle, n'est influencée positivement que par l'utilisation du haut débit par les entreprises. Martin et Nguyen Thi (2015) ont également analysé l'impact de la R&D et de l'utilisation des TIC sur l'innovation en utilisant une variante du modèle CDM sur un échantillon d'entreprises luxembourgeoises. Elles ont effectué une modélisation en trois étapes permettant, dans un premier temps, de déterminer les facteurs explicatifs de l'innovation, en particulier l'intensité de la R&D et l'utilisation des TIC. Dans un deuxième modèle, ils ont estimé l'impact de ces deux variables sur les résultats d'innovation. Dans la dernière étape, ils ont évalué l'effet de l'innovation sur la productivité du travail. Leurs résultats indiquent que la probabilité d'innover (produit, procédé et organisation) dépend positivement du degré d'utilisation des différents types de TIC par les firmes.

Les études citées précédemment concernent principalement les pays développés. La disponibilité de bases de données détaillées dans ces pays a permis d'aller outre le simple impact des TIC sur l'innovation mais d'analyser également l'impact indirect sur la performance des entreprises. L'absence de données appropriées dans les pays émergents et les pays en développement explique la rareté d'études empiriques à ce sujet. Toutefois, quelques travaux ont pu être réalisés dans certains de ces pays.

Ainsi, Santoleri (2015) a testé la relation pouvant lier l'usage des TIC et l'innovation de produit dans les entreprises chiliennes. A l'instar de ses prédécesseurs, Santoleri (2015) confirme le fait qu'un usage évolué de certaines TIC, notamment les ventes en ligne et les logiciels spécifiques à l'industrie, a un impact positif significatif sur l'innovation de produit. L'apport de Santoleri réside dans le fait que toutes les combinaisons des TIC ne sont pas forcément bénéfiques à l'innovation de produit. Ces estimations révèlent

que ce sont les entreprises intensives en TIC qui sont plus susceptibles d'introduire l'innovation de produit. A l'inverse, les entreprises ayant un usage basique des TIC sont corrélées négativement à la probabilité d'introduire l'innovation de produit. Idota et *al.* (2015) se sont penchés sur le lien entre TIC et innovation de produit dans quatre pays de l'Association des Nations de l'Asie du Sud-Est : l'Indonésie, les Philippines, la Thaïlande et le Vietnam. En distinguant entre deux types de TIC (celles utilisées en interne et celles utilisées à l'extérieur de l'entreprise), les auteurs ont montré que les TIC ont un effet positif sur l'innovation de produit par le biais du renforcement des capacités internes. Grazzy et Jung (2016) ont analysé l'effet de l'adoption du haut débit sur l'innovation de produit et de procédé par les entreprises en Amérique Latine et dans les Caraïbes. Leurs résultats indiquent un effet positif sur les deux types d'innovation. Par ailleurs, en recourant une modélisation par équations structurelles, Ueki et Tsuji (2019) ont analysé l'effet des TIC sur l'innovation de produit dans trois pays : le Lao PDR, la Thaïlande et le Vietnam. Ils ont distingué entre trois fonctionnalités des TIC : les TIC permettant l'obtention d'informations externes sur les technologies, les TIC utilisées dans le partage de connaissances en interne sur les produits et la production et les TIC mobilisées pour partager des informations sur les clients et les marchés. Leur recherche indique un effet positif des trois usages des TIC sur l'innovation. Une étude récente sur le Ghana et le Nigéria a révélé un impact positif de l'usage des TIC sur l'innovation de produit, de procédé, organisationnelle et marketing (Karakara et Osabuohien 2020). Enfin une seule étude a procédé à une modélisation CDM sur des données uruguayennes (Aboal et Tacsir, 2018). Les auteurs ont pu démontrer que l'investissement dans les TIC augmente la probabilité d'innover dans le secteur manufacturier et ce, quel que soit le type d'innovation. Cet effet semble être plus prononcé dans le secteur des services.

D'après la discussion ci-dessus, nous formulons les deux hypothèses suivantes :

H1 : Les TIC favorisent l'innovation de produit.
H2 : Les TIC favorisent l'innovation de procédé.

2.2. L'effet d'un usage varié des TIC sur la probabilité d'innover

Le deuxième type d'études s'intéresse à l'impact de l'utilisation diversifiée des TIC par les entreprises sur leurs activités d'innovation. Martin et Nguyen Thi (2015) ont ainsi intégré dans leur étude l'intensité de l'utilisation des TIC dans les entreprises par le biais d'un score dont la valeur est comprise entre 0 (aucune technologie n'est utilisée par l'entreprise) et 5 (au moins 5 types de technologies sont utilisés). Cet indicateur comprend l'utilisation de l'Intranet, de l'Extranet, des groupes-projets, des vidéo-conférences, des forums électroniques, des logiciels de management et des

achats et ventes en ligne. Les résultats d'estimation révèlent que l'intensité de l'usage des TIC exerce un impact positif significatif pour toutes les formes d'innovation. Selon les mêmes auteurs: « *Firms which use a greater variety of ICTs seem to be more inclined to implement new or improved goods, services, production processes or to adopt new organizational practices than are those which use a lesser variety of ICTs. The fact that firms simultaneously use various ICTs should indicate the importance of the advanced development of firms' ICT infrastructure in fostering internal and external relationships, skills sharing and organizational management* » (Martin et Nguyen Thi, 2015, p. 1118). Higón (2011) a également étudié la relation entre l'intensité d'usage des TIC et l'innovation. L'auteur a construit un indicateur permettant de dresser des profils d'utilisation de ces technologies : les non-utilisateurs (qui n'utilisent aucune forme de TIC), les utilisateurs moyens (qui utilisent entre 1 et 4 technologies) et enfin les grands utilisateurs (qui utilisent les 5 technologies retenues). Ses résultats indiquent que les moyens et grands utilisateurs ont une probabilité plus élevée d'innover en procédé que les non-utilisateurs. Par ailleurs, seuls les grands utilisateurs ont une probabilité d'innover en produit plus grande que les entreprises qui n'innovent pas.

Grazzy et Jung (2016) ont également introduit un indicateur de l'intensité de l'usage des TIC définit comme étant l'usage d'Internet à la fois pour faire des achats, délivrer des services aux clients ou pour faire de la recherche en vue de générer de nouvelles idées ou innovations. Cette variable s'avère significative tant pour l'innovation de produit que pour l'innovation de procédé. Les firmes qui utilisent Internet pour les trois activités ont donc une plus grande probabilité d'innover.

Nous pouvons ainsi émettre deux hypothèses supplémentaires relatives à l'impact d'un usage diversifié des TIC sur les deux types d'innovation étudiées.

H3 : L'usage d'une plus grande variété de TIC influence positivement l'innovation de produit.

H4 : L'usage d'une plus grande variété de TIC influence positivement l'innovation de procédé.

Afin de tester les quatre hypothèses ci-dessus, les données et la méthodologie de recherche sont présentées dans la section suivante.

3.   Données, statistiques descriptives et méthodologie de recherche
3.1.   Les données

Les données utilisées proviennent d'une enquête réalisée entre Juin 2015 et Mars 2016 dans le cadre du programme de recherche « Made in Morocco : Industrialisation et développement ». L'objectif de l'enquête Made in Morocco (MIM) est de collecter des informations originales sur les entreprises industrielles relativement à un large éventail de questions tel que

la production, les marchés, le capital humain, etc. Cet article mobilise principalement deux volets : l'innovation et les TIC.

La population des entreprises est composée de l'ensemble des entreprises de transformation et des entreprises exportatrices recensées en 2011. La base de sondage obtenue auprès du ministère du Commerce et de l'Industrie a permis d'extraire un échantillon représentatif. La technique de tirage adoptée est celle d'un échantillonnage stratifié avec allocations proportionnelles pour les strates. La population est divisée en strates sur la base de deux critères : la région et la branche d'activité. L'échantillonnage stratifié est plus précis que l'échantillonnage aléatoire simple car il permet de présenter des estimations au niveau global et par strate (El Aoufi et *al.*,2014). Ainsi les régions retenues sont au nombre de cinq : Casablanca, Rabat, Tanger, Fès-Meknès et Marrakech. Les branches d'activité sont issues de la nomenclature marocaine des activités (NMA 2010). Dans ce travail, nous ne retenons que les industries manufacturières, à savoir : l'industrie agro-alimentaire, l'industrie textile, cuir et habillement, l'industrie chimique et parachimique, l'industrie électrique et électronique et l'artisanat.

3.2.   Définition des variables et statistiques descriptives

L'innovation est la mise en œuvre d'un produit ou d'un procédé nouveaux ou sensiblement améliorés d'une nouvelle méthode de commercialisation ou d'une nouvelle méthode organisationnelle dans les pratiques d'une entreprise, l'organisation du lieu de travail ou les relations extérieures de la firme (OCDE, 2005). Le Manuel d'Oslo définit quatre types d'innovation : l'innovation de produit, l'innovation de procédé, l'innovation marketing et l'innovation organisationnelle. Nous avons décidé dans ce travail de nous limiter aux deux premiers types d'innovation. *L'innovation de produit* consiste en l'introduction d'un bien ou d'un service nouveau ou significativement amélioré. Le produit procure ainsi une plus grande utilité pour le consommateur. La nouveauté s'apprécie quant à l'extension de l'utilisation du produit, l'amélioration de ses fonctionnalités ou encore l'introduction d'un nouvel usage. L'adjonction d'un service à un produit peut également être une innovation. *L'innovation de procédé* consiste en la mise en œuvre de nouvelles connaissances qui entrainent de nouveaux procédés ou méthodes de production. Les services logistiques et de distribution ainsi que les activités de support (comptabilité, fonction achat, maintenance, etc.) représentent aussi des innovations de procédé lorsqu'ils constituent des solutions nouvelles ou significativement améliorées. Dans le questionnaire MIM, il a été demandé aux entreprises si elles avaient introduit une innovation durant les cinq dernières années.

Afin d'analyser le lien entre l'innovation et les TIC, le questionnaire MIM comprend un ensemble d'indicateurs relatifs aux TIC. Nous disposons d'indicateurs relatifs à l'utilisation d'Internet en distinguant entre la simple *connexion à Internet* et la réalisation de *ventes par Internet*. Un autre indicateur des TIC est la *gestion assistée par ordinateur (GAO)* qui représente l'ensemble des outils informatiques permettant de gérer les activités de production telles que les intrants, les ressources, le planning de production, les produits, les commandes, la facturation et les stocks. En outre, les entreprises devaient se prononcer sur l'éventuel recours à *la conception assistée par ordinateur (CAO)*. Celle-ci englobe l'ensemble des méthodes qui permettent de modéliser la conception d'un produit manufacturé. Elle ne se limite pas seulement au dessin mais également à la création d'un objet en étudiant ses réactions dans un environnement non réel. Figure aussi dans le questionnaire l'usage de *robot industriel* définit comme étant toute machine capable d'effectuer des tâches de manière automatique selon un programme préalablement établi. Il peut aussi manipuler des objets en utilisant un système articulé ressemblant à un bras humain. Le dernier indicateur de TIC est l'utilisation d'une *machine à commandes numériques* (MCN) qui est une machine-outil mécanique exécutant des tâches d'usinage selon une précision et une puissance commandées par un ordinateur.

A l'instar des précédentes études (Higón, 2011 ; Martin et Nguyen Thi 2015, Grazzy et Jung (2016), nous avons construit un indice qui révèle la diversité de l'utilisation des TIC sur une échelle allant de 0 à 4, et ce en faisant la somme des six variables de TIC précédemment présentées. Cette variable prend la valeur 0 si l'entreprise n'utilise aucune TIC, la valeur de 1 si elle utilise une seule TIC, la valeur de 2 si elle utilise deux TIC, la valeur de 3 si elle utilise 3 TIC et la valeur 4 si elle utilise 4 TIC et plus.

Afin d'analyser le lien entre TIC et innovation, il est nécessaire de prendre en compte les autres facteurs pouvant influencer l'innovation. La littérature relative aux déterminants de l'innovation identifie deux groupes de variables : d'une part les caractéristiques de l'entreprise qui englobent les facteurs intrinsèques à l'entreprise, et d'autre part l'environnement de l'entreprise qui comprend les caractéristiques de l'environnement externe de l'entreprise.

3.2.1. Les caractéristiques de l'entreprise
- *La taille de l'entreprise :* certains auteurs considèrent que les grandes entreprises ont une plus grande facilité à innover puisque - de par leur accès facilité aux ressources - elles sont capables d'investir à long terme dans la recherche fondamentale dont les bénéfices peuvent être très élevés (Griliches, 1986). Elles disposent en outre d'une meilleure capacité à tirer profit des économies d'échelle (Cohen et Klepper,

1996) et peuvent exploiter les différents marchés sur lesquels elles sont présentes pour écouler leurs innovations (Lu et Beamish, 2004). Ceci concerne aussi les innovations de procédés qu'elles pourront implémenter dans les différents établissements (Kotabe et *al.,* 2002). D'autres auteurs suggèrent que les petites entreprises, du fait de leur plus grande flexibilité, sont plus innovantes (Rogers, 2004). Toutefois, le débat sur l'impact de la taille de l'entreprise sur l'innovation n'est pas encore tranché dans la littérature empirique.

- *L'appartenance à un groupe* : la littérature suggère que l'appartenance à un groupe permet aux entreprises de disposer de financements, de capitaux physique et humain et de transferts de connaissances des sociétés mères vers les filiales（Oakey et *al*., 1980).

- *L'âge de l'entreprise* : le nombre d'années d'expérience peut indiquer la présence d'effets d'apprentissage supposés avoir un effet positif. L'inverse est cependant aussi envisageable puisque les jeunes entreprises peuvent se comporter de manière plus flexible et entreprenante. De ce fait, l'impact de l'âge demeure ambigu dans les différents contextes étudiés (Balasubramanian et Lee, 2008 ; Harris et *al.*, 2003*).*

- *L'exportation* : la relation entre l'activité d'exportation et l'activité d'innovation a largement été traitée dans la littérature. Bien que la relation de causalité entre ces deux variables soit encore sujette à débats, certains auteurs avancent qu'il y a un effet d'apprentissage par l'exportation puisque les entreprises exportatrices ont accès à des marchés géographiques qui leur permettent de bénéficier de connaissances et d'expertises qu'elles ne pourraient pas avoir sur le marché domestique (Blalock, et Gertler, 2004 ; Salomon and Shaver, 2005). Les degrés élevés de concurrence rencontrés à l'international obligent les entreprises à adapter constamment leurs produits aux marchés locaux et tirer parti des nouvelles opportunités par le développement de produits et de procédés (Zahra et al., 2000). A l'inverse, certains auteurs ne trouvent aucun lien entre l'exportation et l'innovation (Harris et *al.*, 2003*).*

- *Les activités de R&D* : on distingue dans la littérature deux types de R&D. La *R&D interne*, principal input de l'innovation, permet aux entreprises de se constituer un stock de connaissances qu'elles pourront utiliser pour innover. La R&D interne améliore la capacité d'absorption, à savoir la capacité à repérer les nouvelles informations, les assimiler et les appliquer à des fins commerciales (Cohen et Levinthal, 1990). La *R&D externe*, quant à elle, permet aux entreprises d'accéder à des connaissances produites à l'extérieur de l'entreprise. Afin de mieux saisir l'effort de R&D, nous avons également introduit

une variable *(salariés dans la R&D)* qui décrit le pourcentage de salariés qui effectuent de la R&D au sein de l'entreprise.

3.2.2. L'environnement de l'entreprise

La littérature capte l'environnement de l'entreprise par le *nombre de concurrents*. Le lien entre structure de marché et innovation a fait l'objet de plusieurs recherches. La logique schumpetérienne considère que le fait de disposer d'un pouvoir de marché incite les entreprises à innover (Cohen et Levin, 1989). C'est d'ailleurs cette logique qui sous-tend le système de brevets. D'autres auteurs ont montré que les industries compétitives sont plus à mêmes de favoriser l'innovation (Arrow, 1962) avançant que l'absence de concurrence entraine une inertie bureaucratique ce qui ne favorise pas l'innovation (Scherer, 1980). Enfin, l'environnement de l'entreprise est saisi à travers les *secteurs industriels* qui permettent de prendre en compte l'effet des opportunités technologiques et les *régions* qui contrôlent l'environnement économique et législatif dans lequel évolue l'entreprise (Higón, 2011). La liste exhaustive des variables est présentée dans le tableau 1.

Tableau 1. Définition des variables utilisées

Variable	Définition
Innovation	
Innovation de produit	=1 si l'entreprise a introduit un produit nouveau ou significativement amélioré durant les cinq dernières années et zéro sinon
Innovation de procédé	=1 si l'entreprise a introduit un produit nouveau ou significativement amélioré durant les cinq dernières années et zéro sinon
Utilisation des TIC	
Internet	
Vente par Internet	
GAO	
Conception assistée par ordinateur	= 1 si l'entreprise utilise l'une des TIC et zéro sinon
Robot	
Machine à commande numérique	
Caractéristiques de l'entreprise	
Effectif	Nombre d'employés en logarithme
Groupe	= 1 si l'entreprise appartient à un groupe et zéro sinon
Age	L'âge de l'entreprise en logarithme
Exportation	= 1 si l'entreprise a exporté ses produits sur les marchés étrangers durant les 5 dernières années et zéro sinon
R& D interne	= 1 si l'entreprise réalise des activités de R&D au sein de l'entreprise durant les cinq dernières années et zéro sinon
R&D externe	= 1 si l'entreprise acquiert des activités de R&D réalisées par d'autres entreprises ou des organismes de recherche

	publics ou privés durant les cinq dernières années et zéro sinon
Salariés dans la R&D	Pourcentage de salariés qui travaillent dans la R&D
Environnement de l'entreprise	
Nombre de concurrents	Trois variables binaires (pas de concurrents - entre 1 et 15 concurrents – plus de 15 concurrents)
Secteur	= 1 si l'entreprise appartient un secteur particulier
Région	=1 si l'entreprise appartient à une région en particulier

3.3. Statistiques descriptives

Le tableau 2 montre les statistiques descriptives. Il apparait que 33% des entreprises ont introduit des innovations de produit et 51% en procédé. En ce qui concerne l'utilisation des TIC, 90% des entreprises ont une connexion à Internet alors que seules 5% font de la vente par Internet. Les GAO et CAO sont utilisées par 57% et 34% des entreprises, respectivement. Enfin, les robots sont utilisés par 10% des entreprises tandis que 35% des entreprises ont recours aux machines à commandes numériques.

Peu d'entreprises poursuivent des activités de R&D et ceci est d'autant plus vrai lorsqu'il s'agit de R&D externe. En effet, 16% des entreprises effectuent des activités de R&D en interne alors que seulement 7% des entreprises acquièrent des activités de R&D réalisées par des entreprises ou organismes de recherche publics ou privés. Le pourcentage de salariés dans la R&D ne dépasse pas 1% en moyenne ce qui confirme la faible activité de R&D dans les entreprises industrielles marocaines

Tableau 2. Statistiques descriptives

Variable	Observations	Mean	Std. Dev.	Min	Max
Innovation de produit	524	0,336	0,473	0	1
Innovation de procédé	524	0,510	0,500	0	1
Internet	524	0,908	0,289	0	1
Vente par Internet	524	0,053	0,225	0	1
GAO	524	0,576	0,495	0	1
CAO	524	0,345	0,476	0	1
Robots	524	0,107	0,309	0	1
MCN	524	0,351	0,478	0	1
R&D interne	524	0,162	0,369	0	1
R&D externe	524	0,074	0,263	0	1
Salariés dans la R&D	524	0,981	4,411	0	66
Effectif	524	140.277	392,234	1	5400
Groupe	524	0,141	0,349	0	1
Age	524	22.129	14.393	1	82
Exportation	524	0,475	0,500	0	1
Zéro concurrents	524	0,050	0,217	0	1
Peu de concurrents	524	0,323	0,468	0	1

Beaucoup de concurrents	524	0,628	0,484	0	1
Agroalimentaire	524	0,149	0,356	0	1
Textile	524	0,445	0,497	0	1
Chimie	524	0,170	0,376	0	1
Mécanique	524	0,166	0,372	0	1
Electrique	524	0,040	0,196	0	1
Artisanat	524	0,031	0,172	0	1
Casablanca	524	0,603	0,490	0	1
Rabat	524	0,050	0,217	0	1
Tanger	524	0,153	0,360	0	1
Marrakech	524	0,071	0,256	0	1
Fès	524	0,124	0,330	0	1

Les statistiques descriptives concernant la taille et l'âge de l'entreprise sont présentées sans transformation logarithmique. Il apparait ainsi qu'en moyenne les entreprises comprennent 140 salariés et ont 22 ans d'existence (avec des écart-types respectifs de 392 et 14). Par ailleurs, 14% des entreprises appartiennent à des groupes et 47% exportent leurs produits à l'étranger. En ce qui concerne l'intensité de la concurrence, 63% des entreprises ont déclaré avoir plus de 15 concurrents, elles sont 32% à avoir entre 1 et 15 concurrents et uniquement 5% à n'avoir aucun concurrent. Le tableau 3 examine les différences d'utilisation des TIC entre innovateurs et non-innovateurs en distinguant entre l'innovation de produit et l'innovation de procédé. Globalement, les entreprises qui innovent en produit ont une utilisation significativement plus élevée que celles qui n'innovent pas. On note cependant une exception concernant la vente par Internet qui ne présente pas de différence de moyenne. En ce qui concerne l'innovation de procédé, il existe des différences significatives dans l'utilisation de tous les types de TIC entre innovateurs et non-innovateurs.

Tableau 3. Utilisation des TIC selon l'innovation de produit et de procédé

	Innovation de produit			
	Innovateurs		Non innovateurs	
	Observations	Moyenne	Observations	Moyenne
Internet	176	0,960***	348	0,882
Vente par Internet	176	0,057	348	0,052
GAO	176	0,676***	348	0,526
CAO	176	0,460***	348	0,287
Robots	176	0,170***	348	0,075
MCN	176	0,5***	348	0,276
	Innovation de procédé			
	Innovateurs		Non innovateurs	
	Observations	Moyenne	Observations	Moyenne
Internet	267	0,974***	257	0,840
Vente par Internet	267	0,075**	257	0,031
GAO	267	0,734***	257	0,412
CAO	267	0,449***	257	0,237
Robots	267	0,172***	257	0,039
MCN	267	0,453***	257	0,245

NB : ***, ** les différences de moyenne entre les innovateurs et les non-innovateurs sont statistiquement significatives à 1% et 5%

3.3. Modélisation économétrique

Pour répondre à notre problématique, nous avons opté pour un modèle économétrique qualitatif de choix discrets. Ce type d'approche est particulièrement adapté pour des données d'enquêtes de nature qualitative. Ces modèles constituent une méthodologie de référence dans l'examen des processus décisionnels individuels. En effet, nos variables endogènes sont la décision individuelle d'une entreprise « d'innover » ou « de ne pas innover » en produit ou en procédé. Il s'agit de variables qualitatives binaires prenant la valeur « 1 » si l'entreprise innove en produit ou en procédé et « 0 » sinon.

Schématiquement, la situation analysée est la suivante : l'entreprise i innove ($y_i = 1$) ou n'innove pas ($y_i = 0$). L'indice j correspond aux types d'innovation (produit ou procédé). Le modèle repose sur l'hypothèse selon laquelle la valeur prise par y_{ij} dépend de la valeur de la variable latente inobservée y_{ij}^*. Cette dernière correspond à la propension de l'entreprise i à innover en produit ou en procédé. Le modèle peut s'écrire alors comme suit :

$$y_{ij} = \begin{cases} \mathbf{1 \ si} \ y_{ij}^* > 0 \\ \mathbf{0 \ si} \ y_{ij}^* \leq 0 \end{cases} \quad \textbf{où} \quad y_{ij}^* = x_{ij} \beta' + \varepsilon_{ij} \quad \forall i = 1, \dots, N$$

Où les perturbations ε_{ij} représentent les facteurs pouvant influencer les formes d'innovation mais qui ne sont pas captées par le modèle.

Étant donné que nos deux variables endogènes sont susceptibles d'être corrélées et qu'elles peuvent être influencées conjointement par les variables inobservées, nous avons opté pour un modèle probit bivarié. Ce choix est dicté par le fait que les entreprises ayant investi dans l'innovation de produit peuvent être amenées à investir dans l'innovation de procédé et inversement. Il ne s'agit pas de vérifier la relation causale entre les deux types d'innovation mais seulement de supposer une corrélation entre les résidus des deux équations relatives aux deux types d'innovation. De ce fait, le modèle que nous proposons estimera simultanément, en plus des paramètres des variables exogènes susceptibles d'expliquer les deux formes d'innovation, un coefficient, rho ρ, de corrélation des termes d'erreurs. Si ρ est significativement différent de zéro, les comportements des entreprises en termes d'innovation sont dépendants les uns des autres.

De ce qui précède, nous formalisons deux variables aléatoires binaires dans notre modèle, à savoir $Y_{ij_{prd}}$ et $Y_{ij_{prc}}$ avec :

$$Y_{ij_{prd}} = \begin{cases} \mathbf{1} \text{ si l'entreprise } \boldsymbol{i} \text{ entreprend de l'innovation de produit} \\ \mathbf{0} \; sinon \end{cases}$$

Et

$$Y_{ij_{prc}} = \begin{cases} \mathbf{1} \text{ si l'entreprise } \boldsymbol{i} \text{ entreprend de l'innovation de procédé} \\ \mathbf{0} \; sinon \end{cases}$$

Notre modèle probit bivarié peut être formalisé comme suit pour chaque entreprise i :

- La propension à innover en produit $Y^*_{ij_{prd}}$:

$Y^*_{ij_{prd}} = x_{ij_{prd}}\beta' + \varepsilon_{ij_{prd}}$, la variable latente $y^*_{ij_{prd}}$ est observée uniquement si l'entreprise entreprend de l'innovation de produit, avec :

$$Y_{ij_{prd}} = \begin{cases} \mathbf{1} \; \boldsymbol{si} \;\; Y^*_{ij_{prd}} > 0 \\ \mathbf{0} \; si \;\; Y^*_{ij_{prd}} \leq 0 \end{cases}$$

- La propension à innover en procédé $Y^*_{ij_{prc}}$:

$Y^*_{ij_{prc}} = x_{ij_{prc}}{}'\beta + \varepsilon_{ij_{prd}}$, on observe $Y^*_{ij_{prc}}$ uniquement si l'entreprise entreprend de l'innovation de procédé, avec :

$$Y_{ij_{prc}} = \begin{cases} \mathbf{1} \;\; \boldsymbol{si} \;\; Y^*_{ij_{prc}} > 0 \\ \mathbf{0} \; si \; Y^*_{ij_{prc}} \leq 0 \end{cases}$$

Nous avons retenu les mêmes variables exogènes pour expliquer les deux types d'innovation. L'estimation des composantes du vecteur des paramètres β' s'effectue par la méthode du maximum de vraisemblance. Pour ce qui est du coefficient de corrélation des termes d'erreurs des deux équations ρ, un test de khi2 est effectué afin de vérifier la dépendance entre la décision d'innover en produit et celle d'innover en procédé. Si ρ est significativement différent de 0 (H$_0$: ρ = 0), on rejette l'hypothèse nulle et on admet que les deux types d'innovation sont interdépendants.

4. Estimations économétriques

Le tableau 4 présente les résultats d'estimation du modèle probit bivarié. Nous commençons par constater que le coefficient ρ qui mesure la corrélation des termes d'erreurs des deux équations est significativement différent de zéro. Il existe donc une interdépendance des décisions d'innover en produit et en procédé. Le recours au modèle probit bivarié est dès lors justifié.

Les résultats sont conformes à la littérature empirique. A l'instar de nos prédécesseurs, nous constatons que les TIC exercent un impact très important sur le comportement des entreprises en termes d'innovation. Nous relevons également que cet impact est différent selon la nature des technologies introduites et selon le type d'innovation. Ainsi, nous observons que la probabilité d'innover en produit ou en procédé augmente avec **la connexion à Internet**. A ce titre, Spiezia (2011) considère que les TIC peuvent être considérées comme une source d'innovation grâce à la circulation d'idées et les collaborations qu'elles génèrent entre les entreprises et leurs partenaires. L'accès et la connexion à Internet permettraient aux entreprises de pratiquer différents types de veilles, entre autres la veille technologique, commerciale et stratégique, qui s'avèrent être des ingrédients importants pour l'innovation et amènent à des gains d'efficacité significatifs.

Les autres variables de TIC ont présenté un impact différent sur les deux types d'innovation. Nos résultats indiquent que l'introduction de machines à commandes numériques dans le processus de production augmente significativement la probabilité de faire de l'innovation de produit. Pour ce qui est de l'innovation de procédé, seules les variables Gestion Assistée par Ordinateur et l'existence de robots industriels ont

présenté un effet positif significatif. Autrement dit, la propension de faire de l'innovation de procédé augmente pour les entreprises ayant informatisé la gestion de leurs activités productives et pour celles ayant investi dans l'automatisation de leur processus de production. Cela confirme les résultats obtenus dans d'autres contextes, notamment ceux de Higón (2011) dans son étude portant sur l'impact des TIC sur le comportement d'innovation des petites et moyennes entreprises au Royaume-Uni. En effet, Higón (2011) a relevé l'existence d'une relation significativement positive entre l'utilisation d'applications informatiques (telles que les tableurs, logiciel de comptabilité, etc.) et l'innovation de procédé.

Par ailleurs, la variable TIC agrégée, que nous avons construite en sommant les six variables TIC binaires, s'est révélée positive et significative pour les deux types d'innovation. Ce résultat laisse présager que les entreprises ayant recours à différents types de TIC sont plus enclines à innover en produit et en procédé, relativement à celles qui utilisent peu ou pas de technologies. Ce résultat obtenu pour les entreprises marocaines confirme ceux constatés dans d'autres contextes (Martin et Nguyen Thi, 2015 ; Higón , 2011 ; Grazzy et Jung, 2016).

Concernant les variables relatives aux activités de Recherche et Développement qui sont représentées par la R&D interne, la R&D externe et par le pourcentage de salariés consacrés aux activités de R&D au sein de l'entreprise, nous remarquons qu'elles exercent un impact positif significatif sur l'innovation de produit. En revanche, l'innovation de procédé semble n'être influencée positivement que par la R&D interne. La littérature théorique et empirique est unanime sur le fait que la R&D est un catalyseur important de l'innovation (Crépon et *al.*, 1998 ; Mairesse et Mohnen, 2005 ; Janz et *al.*, 2004 ; Lööf et Heshmati, 2006 ; Parisi et *al.* 2006, Polder et *al.*, 2009 ; Higón, 2011 ; Martin et Nguyen Thi, 2015). Nos résultats corroborent partiellement ceux mis en exergue par Martin et Nguyen Thi (2015) sur données luxembourgeoises. Ces derniers ont constaté que la probabilité de réaliser une innovation de produit est plus grande pour les entreprises qui investissement aussi bien dans la R&D interne qu'externe. En revanche, pour l'innovation de procédé, nos résultats ne concordent pas avec ceux obtenus par Martin et Nguyen Thi (2015) qui obtiennent que la propension de faire de l'innovation de procédé augmente avec l'intensité des dépenses de R&D externes. Nous justifions notre résultat par le fait que l'innovation de procédé peut être stimulée par la R&D interne car elle implique l'adoption ou l'amélioration en interne de méthodes de production ou de distribution. Selon le manuel d'Oslo de l'OCDE, « elle peut faire intervenir des changements affectant – séparément ou simultanément – les matériels, les ressources humaines ou les méthodes de travail » (OCDE, 2005).

Pour ce qui est de la variable relative à l'intensité de la concurrence, nous avons estimé notre modèle en prenant comme modalité de référence « beaucoup de concurrents ». Nous soulignons que les entreprises disposant d'un pouvoir de marché ont plus tendance que les autres à faire de l'innovation de procédé. Ce résultat peut s'expliquer par le fait que ces entreprises entretiennent leur position dominante sur le marché en ayant recours à une barrière à l'entrée extrême qui s'avère être l'innovation en procédé dont l'objectif principal est la réduction des coûts de production. De même, les entreprises ayant peu de concurrents se distinguent positivement et significativement des autres en ce qui concerne la propension à faire de l'innovation de produit. Notre résultat rejoint celui obtenu par Aghion et al. (2005) qui ont constaté que la relation entre le degré de concurrence et l'innovation est non monotone et a la forme d'un U inversé. Pour de faibles niveaux de concurrence, il existe une relation croissante entre concurrence et innovation car tout accroissement de la concurrence sera favorable à l'innovation. A l'inverse, l'innovation devient décroissante lorsque le niveau de la concurrence augmente. Notons que cette variable a toujours présenté un effet ambigu dans la littérature. Scherer (1983) constate que les industries présentant une forte concentration industrielle ont plus tendance à faire de l'innovation de procédé que de l'innovation de produit. Pour Martin et Nguyen Thi (2015), la variable intensité de la concurrence s'est montrée non significative dans l'explication du comportement d'innovation des entreprises luxembourgeoises.

Par ailleurs, nos résultats concordent avec les précédentes études qui ont montré que l'activité d'exportation entraine des niveaux plus élevés d'innovation (Damijan et *al.*, 2010 ; Golovko et Valentini, 2011 ; Roper et Love, 2002 ; Salomon et Shaver, 2005). Cependant, ils indiquent que les activités d'exportation ont un effet significatif et positif uniquement sur la probabilité d'innover en procédés mais pas en produits. Ces résultats contredisent ceux de Filipescu et *al.* (2013) qui, en analysant des données d'entreprises espagnoles, ont trouvé que l'effet de l'apprentissage par l'exportation opérait plus par l'innovation de produit que par l'innovation de procédé. Toutefois, nos résultats sont conformes à ceux obtenus par Damijan et *al.* (2010) pour les entreprises slovènes, qui concluent que l'effet d'apprentissage par l'exportation se produit par le biais de l'innovation de procédé en améliorant l'efficacité technique des entreprises plutôt que par l'innovation de produit.

Tableau 4. Estimations du probit bivarié

*** : significatif au seuil de 1% ; **significatif au seuil de 5% ; * significatif au seuil de 10%

	Innovation de produit		Innovation de procédé		Innovation de produit		Innovation de procédé	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Internet	0,551**	0,28	0,649**	0,285				
Vente par Internet	-0,237	0,292	0,485	0,306				
GAO	0,161	0,141	0,537***	0,141				
CAO	0,028	0,145	0,069	0,144				
Robots	0,029	0,221	0,533**	0,228				
MCN	0,480***	0,14	0,217	0,139				
TIC					0,233***	0,062	0,351***	0,063
R&D interne	1,021***	0,196	0,953***	0,215	0,982***	0,194	0,891***	0,218
R&D externe	0,471*	0,242	0,242	0,283	0,403*	0,244	0,247	0,28
Salariés dans la R&D	0,054***	0,017	0,004	0,017	0,051***	0,016	0,001	0,016
Ln(effectif)	-0,084	0,065	0,094	0,066	-0,076	0,065	0,104	0,065
Groupe	0,178	0,181	-0,058	0,192	0,184	0,178	-0,076	0,189
Ln(age)	0,102	0,102	0,019	0,092	0,107	0,103	0,000	0,092
Exportation	0,065	0,152	0,419***	0,152	0,075	0,151	0,451***	0,15
Zero concurrent	0,054	0,293	0,524*	0,303	0,092	0,29	0,533*	0,321
Peu de concurrents	0,281**	0,139	0,373***	0,14	0,262*	0,137	0,390***	0,139
Agroalimentaire	-0,539	0,339	0,507	0,326	-0,549*	0,332	0,550*	0,321
Textile	-0,484	0,299	0,174	0,29	-0,493*	0,296	0,162	0,291
Chimie	-0,471	0,317	0,405	0,305	-0,421	0,314	0,443	0,306
Mécanique	-0,641*	0,332	0,294	0,317	-0,623*	0,329	0,311	0,316
Artisanat	-0,844*	0,501	0,08	0,481	-0,895*	0,488	0,022	0,457
Casablanca	0,392*	0,214	-0,125	0,199	0,362*	0,21	-0,084	0,192
Rabat	-0,115	0,35	0,072	0,324	-0,149	0,356	0,007	0,313
Tanger	0,014	0,265	-0,222	0,248	-0,093	0,258	-0,158	0,237
Marrakech	0,852***	0,291	-0,21	0,297	0,656**	0,287	-0,14	0,289
Constante	-1,400***	0,536	-2,118***	0,521	-1,152**	0,491	-1,871***	0,472
Rho	0,580	0.066			0.574	0.065		
Chi2(1)	44.7758				45.7446			
Prob>chi2	0.0000				0.0000			
Observations	524				524			

En ce qui concerne la variable région de localisation de l'entreprise, le questionnaire a été administré dans 5 régions : Rabat, Casablanca, Meknès-Fès, Marrakech et Tanger. Nous avons pris pour catégorie de référence la localisation dans la région Meknès-Fès. Nous n'avons relevé aucune différence de comportement des entreprises en termes d'innovation de procédé selon la région. En revanche, nous avons constaté que les entreprises implantées dans les régions du Grand Casablanca et de Marrakech ont

significativement plus tendance à innover en produit que celles localisées dans les autres régions. Nous pouvons justifier ce résultat par la richesse du contexte institutionnel de ces deux régions relativement aux autres. Ce résultat peut être étayé par la littérature sur les Systèmes Régionaux d'Innovation (Cooke, 1992) qui soutient que l'innovation est un processus systémique territorialisé, favorisé par les interactions des ressources spatialement localisées et par le contexte institutionnel dans lequel elle se développe (Asheim et Gertler, 2004 ; Malmberg et Maskell, 2002). Ces travaux admettent le rôle prépondérant de l'environnement dans lequel évoluent les entreprises innovatrices et de l'importance de la proximité physique entre elles. La région est dès lors perçue comme un catalyseur de l'innovation car ; « *elle constitue un espace de relation entre la technologie, les marchés, le capital productif, les savoir-faire, la culture technique, etc*. » (Doloreux et Bitard, 2005, p.24).

Quant à la variable d'appartenance sectorielle des entreprises, nous avons pris le secteur électrique et électronique comme catégorie de référence. Nous relevons que seules les entreprises du secteur de l'artisanat et de l'industrie mécanique se distinguent négativement et significativement des autres pour l'innovation de produit.

Conclusion

Dans ce papier, nous explorons le lien entre l'utilisation des TIC et l'innovation. Plusieurs recherches ont tenté d'expliquer ce lien dans le cadre de pays développés mais rares sont celles qui l'ont fait dans le cadre de pays en développement. Nous utilisons une base de données originale portant sur les entreprises industrielles marocaines et prenons en compte une variété de mesures des TIC. Notre approche empirique se base sur un modèle probit bivarié permettant d'expliquer aussi bien l'innovation de produit que l'innovation de procédé. Ces données nous permettent de dire que l'utilisation des TIC favorise la propension à innover. De plus, nous constatons que cet impact peut différer selon les TIC utilisées et les types d'innovation. Il apparait ainsi que l'utilisation des machines à commandes numériques favorise l'innovation de produit tandis que le recours à la gestion assistée par ordinateur et aux robots encouragent l'innovation de procédé. La connexion à Internet, quant à elle, a un effet positif sur les deux types d'innovation. En outre, nous avons montré que les entreprises qui utilisent les TIC de façon intensive ont plus de probabilité d'innover en produit ou en procédé que celles qui utilisent peu ou pas de technologies.

Ces conclusions fournissent d'importantes implications en termes de politiques publiques et suggèrent que toute action visant à inciter les entreprises à innover devrait prendre en compte le rôle des technologies de l'information et de la communication. Les initiatives visant à promouvoir l'un ou l'autre des types d'innovation seraient plus abouties si les pouvoirs publics

se focalisaient sur les TIC qui déterminent l'innovation de produit ou l'innovation de procédé. Quoi qu'il en soit, afin d'être plus innovantes, les entreprises ont tout intérêt à combiner entre les différentes formes de TIC.

Cet article vient ainsi enrichir la littérature portant sur l'effet des TIC sur l'innovation. Il présente cependant quelques limites. En effet, cette étude gagnerait en pertinence et permettrait de mieux analyser la relation causale entre l'utilisation des TIC et l'innovation si l'on disposait de données longitudinales. Malheureusement ce type de données reste très rare dans les pays en développement. Enfin, l'un des axes de recherche futurs consiste à élargir le champ d'analyse en incluant l'incidence des TIC sur l'innovation dans le secteur des services.

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L'Autonomisation Economique des Femmes dans un Contexte d'Innovation Sociale

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Résumé

Ce papier fait partie d'un essai sur l'économie sociale et solidaire, se penchant sur l'étude du concept d'autonomisation économique des femmes dans le contexte de l'innovation sociale, tout en mettant l'accent sur les spécificités théoriques, les enjeux et les contraintes qui en découlent. Partant d'un constat en vertu duquel l'innovation sociale peut contribuer au renforcement des activités génératrices de revenus et plus particulièrement à la promotion de l'autonomisation économique des femmes, nous cherchons à mettre en exergue les principales acceptions théoriques retenues dans ce sens ainsi que les travaux ayant décelés les relations de causalité potentiellement existantes entre les deux concepts. Dans la même veine, nous avons contextualisé la problématique de contribution de l'innovation sociale à l'autonomisation économique des femmes par rapport aux travaux de recherche menés aussi bien au Maroc que dans les centrées voisines. Les résultats obtenus à cet égard nous confirment que ces deux concepts sont étroitement liés. De plus, l'innovation sociale contribue d'une manière significative à la promotion de l'autonomisation des femmes. D'où l'intérêt de dresser un modèle conceptuel susceptible de fournir une voie de recherche fondée théoriquement et vérifiable empiriquement.

Keywords: Autonomisation ; femmes ; inclusion sociale ; innovation sociale

Women's Economic Empowerment in a Social Innovation Context

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Abstract

This paper is part of a study in social and solidarity economy, aiming to explore the concept of women's economic empowerment in the context of social innovation, while emphasizing the theoretical specifics, challenges, and constraints that arise from it. Starting from the observation that social innovation can contribute to strengthening income-generating activities, especially in promoting women's economic empowerment, we seek to highlight the main theoretical frameworks in this regard, as well as the studies that have identified potentially existing causal relationships between the two concepts. In the same vein, we have contextualized the issue of social innovation's contribution to women's economic empowerment in relation to research conducted both in Morocco and in neighboring regions. The results obtained in this regard confirm that these two concepts are closely linked. Furthermore, social innovation significantly contributes to promoting women's empowerment. Hence, the importance of developing a conceptual model capable of providing a theoretically grounded and empirically verifiable research path.

Keywords: Empowerment; women ; social inclusion; social innovation

Introduction

Les différents programmes des institutions internationales menés dans un cadre d'autonomisation économique des femmes s'adressent aux femmes les plus pauvres ou en situation vulnérable. D'ailleurs, une instauration du développement durable exige le renforcement de cette autonomisation pour atteindre la croissance inclusive.

Néanmoins, la discrimination basée sur le genre constitue une anomalie qui entrave le bien-être des femmes, en particulier en ce qui concerne l'accès à des emplois bien rémunérés, l'atteinte de postes élevés, l'accès aux ressources économiques et la participation à l'élaboration des politiques économiques et sociales. Par conséquent, ce facteur d'inégalité de genre représente la principale raison pour laquelle la participation des femmes à la population active demeure limitée, tant au niveau national qu'international.

Au Maroc, le programme de l'Initiative Nationale pour le Développement Humain (INDH) joue un rôle clé dans la promotion de

l'autonomisation des femmes à travers des Activités Génératrices de Revenus (AGR), tant dans les zones rurales que dans les zones urbaines. L'entrepreneuriat coopératif, intégré dans le cadre de l'économie sociale et solidaire, est spécifiquement conçu à cet effet. Il est considéré comme un moyen de faciliter l'intégration des femmes dans l'économie et de renforcer leur participation au développement ainsi que leur ancrage territorial.

À ce propos, l'objectif de cette recherche est d'examiner de manière approfondie deux concepts clés : l'autonomisation économique des femmes et l'innovation sociale. Cela implique d'identifier les liens et les enjeux entre ces concepts, remettant ainsi en question la problématique de recherche qui se fonde sur l'innovation sociale en tant que levier de l'autonomisation économique des femmes pendant la pandémie de Covid-19. La méthodologie adoptée consiste à réaliser une revue de littérature, englobant à la fois les travaux théoriques et les diverses études et expériences reliant l'innovation sociale à l'autonomisation économique des femmes.

Pour ce faire, dans une première section, on opte pour la présentation d'un corpus théorique de l'innovation sociale et des acceptions théoriques de l'autonomisation économique des femmes afin de détecter les liens et les enjeux théoriques. La deuxième section sera destinée à la détermination du rôle de l'innovation sociale dans l'autonomisation économique des femmes à travers un survol des travaux de recherche menés dans une panoplie de contextes. Donc, la finalité visée sera de mettre en exergue les particularités théoriques susceptibles de former un modèle de recherche hypothétique.

1. L'innovation sociale et l'autonomisation économique des femmes : genèse conceptuelle et acceptions théoriques

Dans cette présente section, nous allons procéder à l'analyse en profondeur des particularités théoriques attribuées respectivement à l'innovation sociale et à l'autonomisation économique des femmes, et d'identifier les sous-construits qui interviennent dans la relation entre les deux concepts.

1.1 L'innovation sociale : concept et fondements théoriques

Le concept d'innovation suscite l'intérêt des débats actuels sur l'émergence d'entreprises innovantes, susceptibles à relever le défi de la compétitivité dans un contexte désormais international. Que ce soit au plan académique ou dans les sphères professionnelle et institutionnelle, un consensus tend à présenter l'innovation comme un moyen de promotion et de développement des organisations.

De nombreux arguments sont avancés en faveur de son importance : complexité et turbulence accrues dans tous les secteurs d'activités, réduction du cycle de vie des produits, intensification du rythme des changements

(technologiques, sociaux ou institutionnels), mondialisation des marchés, etc. Dès les années 1980, Drucker (1987) avait présenté l'innovation comme une condition même de survie pour les organisations.

Cependant, en dépit des avancées significatives réalisées dans le champ de l'innovation au plan académique, contribuant à une perspective élargie de l'innovation, de nombreuses difficultés et ambigüités conceptuelles marquent encore ce champ de la littérature (Osburg et Schmidpeter, 2013).

Comme l'indique clairement Richez-Battesti (2011, p.98), « l'innovation technologique demeure dominante,l'innovation organisationnelle gagne en reconnaissance, tandis que l'innovation sociale demeure encore largement indéfinie ». Ainsi, si sur le plan de la pratique, l'intérêt des acteurs socioéconomiques et des politiques publiques pour l'innovation sociale est de plus en plus manifeste, sous l'effet combiné de plusieurs facteurs (L'incorporation formelle du projet politique axé sur le développement durable, la viabilité de la croissance économique, et l'ancrage des initiatives économiques au niveau territorial) (Richez-Battesti, 2011), la recherche académique demeure relativement sous-développée et ne propose pas encore un corpus théorique intégré.

« Invention sociale » ou « innovation sociale », c'est un concept qui a captivé l'attention des chercheurs universitaires ainsi que des acteurs socioéconomiques et politiques en raison de son importance et ses conséquences sur le déroulement et le développement des communautés. Dans les années 70, le terme a émergé simultanément avec la crise du fordisme et la faiblesse du compromis social de l'après-guerre, cependant, il est développé par Freeman dans les dernières années.

Le développement des recherches a démontré que l'innovation sociale est en liaison avec le développement territorial (Hillier et al. 2004), l'innovation organisationnelle (Alter 2000), l'économie sociale et solidaire, le capital social (Bouchard 2006 ; Harrisson et Vezina 2006 ; Levesque 2006), et l'innovation institutionnelle qui s'entrelace avec les systèmes de règlementation et de politiques, ainsi que les normes en place pour gérer les conflits (Lévesque, Mendell 2004).

Cela veut dire que l'innovation sociale s'intervient pour relancer de divers champs qui ont une perspective sociologique et économique susceptible à promouvoir le changement social et à améliorer les conditions de vie des sociétés. Autrement dit, l'OCDE (2002) a un rôle fondamental dans la diffusion du concept « innovation sociale » en mettant la lumière sur les éléments qui définissent des innovations non technologiques (organisationnelles ou sociales).

Taylor (1970) a caractérisé l'innovation sociale comme la création de nouvelles approches visant à répondre aux besoins sociaux.. Dans le même sillage, Howaldt et Schwarz (2010) l'ont considéré comme « une nouvelle

combinaison et/ou une nouvelle configuration des pratiques sociales dans des domaines d'action spécifiques, créées de manière délibérée par des acteurs ou des groupes d'acteurs au sein de contextes sociaux, dans le but d'améliorer ou de répondre de manière plus efficace aux besoins et aux problèmes par rapport aux pratiques établies ».

À la lignée de la pensée de Schumpeter sur la « discontinuité de l'évolution » : un nouveau bien, une nouvelle méthode Schumpeter de production, un nouveau débouché, une nouvelle source de matière première, et une nouvelle organisation. Cette composition à cinq voies se traduit par l'émergence de trois aspects de l'innovation tels que, les innovations de produits (qui appartient à l'univers du marché), les innovations d'organisation et les innovations de procédé (qui appartient à l'univers hiérarchique), cités par Castel et Prades (2004).

D'après Moulaert et al. (2005), l'innovation sociale répond à trois dimensions en interaction : la première remplie les besoins sociaux et humains non encore satisfaits ; la deuxième vise à introduire les changements dans les relations sociales ; et la troisième correspond à l'autonomisation en augmentant les capacités sociopolitiques et celles d'accès aux ressources. Sur la base de cette dernière dimension, Anderson et al. (2014) rajoutent que l'innovation sociale est l'ensemble de nouvelles solutions aux défis sociaux qui ont pour objectif d'atteindre l'autonomisation, l'égalité et la justice.

Ainsi, l'empowerment demeure comme étant une activité primordiale de la valeur sociale construit par l'entrepreneuriat social. Celui-ci est conçu comme une intervention pour les personnes n'ayant pas suffisamment de pouvoir, et un moyen d'obtention du pouvoir afin de prendre des décisions et des choix opportuns dans la vie (Chandra et Liang, 2017 ; cités par Sadabadi et Rahimi Rad 2021).

Richez-Battesti et al (2012) tient la pensée que l'innovation sociale n'est plus liée à une distinction entre différentes catégories de personnes, mais plutôt à l'utilisation des ressources diverses au sein d'organisations participatives qui favorisent la collaboration et l'apprentissage collectif à l'intérieur et à l'extérieur de ces structures.

Dans cette perspective, l'entrepreneuriat collectif s'engage au niveau territorial pour rassembler les acteurs et les ressources déjà présents dans ce territoire. Sachant que les territoires sont envisagés comme des entités à la fois façonnées par des dynamiques socioéconomiques et socioculturelles, favorisant à la fois la prévention et la résolution de problèmes sociaux, ainsi que la création d'environnements novateurs qui révèlent des ressources. (Gianfaldoni et Manoury, p. 10, 2018).

Selon Gianfaldoni et Manoury (2019) l'innovation sociale est un processus qui regroupe trois caractères inséparables de la dimension relationnelle entre acteurs engagés : le premier est lié à la gouvernance

partenariale territoriale, le deuxième concerne des formes de proximité territoriale entre les parties prenantes d'un dispositif ou d'un projet et le dernier s'applique à la création et à la valorisation des ressources territoriales.

La conférence des Nations Unies a été marquée par la présentation de plusieurs travaux portant sur l'innovation sociale, parmi lesquels celui de King (1984). Ce dernier a identifié quatre catégories d'innovations sociales visant à favoriser le développement économique et social. La deuxième catégorie stipule que les innovations sociales sont conçues pour préserver l'environnement et assurer la durabilité des ressources naturelles d'un territoire.

De manière similaire, l'innovation sociale englobe la création de nouvelles solutions efficaces qui répondent aux besoins de la société. Elle encourage également le développement de compétences et de relations inédites ou améliorées, tout en contribuant à une répartition plus judicieuse des ressources et des actifs, comme indiqué par Anheier et al. en 2019.

L'innovation sociale peut être abordée selon deux grandes approches. L'une d'elles considère que l'innovation sociale est portée par des entrepreneurs ou des initiatives économiques à but lucratif, mais orientée vers des finalités sociales. De nombreux chercheurs, tels que Perrini, Vurro et Costanzo (2010), Seyfang et Haxeltine (2012), Bonifacio (2014) et Cajaiba-Santana (2014), ont exploré des problématiques associées aux transformations sociales en mobilisant les notions d'innovation sociale et d'entrepreneuriat social, bien que ces notions proviennent de domaines intellectuels distincts, à savoir l'innovation et l'entrepreneuriat.

Dans ce contexte, l'innovation sociale et l'entrepreneuriat social ont joué un rôle crucial dans la gestion du changement social, en contribuant à résoudre les problèmes et à relever les défis sociaux. La première approche de l'innovation sociale met l'accent sur les solutions entrepreneuriales pour répondre aux enjeux sociaux, tandis que la seconde approche se penche sur les processus collectifs qui peuvent conduire au changement social, comme mentionné par Bouchard (2013). Dans cette perspective, l'innovation sociale est davantage associée à des initiatives collectives et à des processus de changement social.

De plus, Westley et Antadze (2010) soulignent l'interconnexion étroite entre les concepts d'entrepreneuriat social, d'entreprise sociale et d'innovation sociale. Il fait valoir que les entrepreneurs sociaux peuvent être intégrés dans des entreprises sociales tout en contribuant à promouvoir des innovations sociales au sein de ces organisations.

Il est donc possible de déduire que l'innovation sociale et l'entrepreneuriat social sont deux concepts étroitement liés qui visent à résoudre les problèmes sociaux, à créer des changements dans la société et à

favoriser le développement d'innovations sociales au sein des entreprises sociales.

Nous avons donné un aperçu sur l'innovation sociale en soulevant son utilité en matière de plusieurs champs pour promouvoir le changement dans les communautés et réaliser des fins économiques. Théoriquement, le concept « autonomisation » est une composante fondamentale des champs structurant l'innovation sociale. D'où l'intérêt de se focaliser sur ce deuxième concept clé dans la partie suivante pour déterminer ses spécificités et ses enjeux théoriques.

1.2 L'autonomisation économique : des approches théoriques diversifiées

Le concept « autonomisation » n'est pas récent, elle trouve ses origines et ses influences dans une variété de domaines tels que le freudisme, le féminisme, le mouvement black Power, la théologie et le gandhisme, comme mentionné par Simon (1994) et Cornwall et Brock (2005), cités par Calvès (2009). Selon Vallerie (2008), ce terme a connu son essor aux États-Unis au début du vingtième siècle, porté par des femmes se battant pour l'obtention de leurs droits.

L'autonomisation se concentre sur trois dimensions essentielles : d'abord, les "ressources", incluant les éléments humains, matériels ou sociales ; ensuite, la "capacité d'agir" ou la "prise de décision individuelle", qui représente le processus expliquant les actions influençant les choix des individus ; enfin, les "résultats" découlant de ce processus (Kabeer, 2002). Autrement dit, l'autonomisation exige des actions continues à long terme visant à mettre fin aux anciens modèles de dévalorisation et de dépendance, et à encourager l'émergence de nouvelles personnalités (Stromquist, 2002, p. 23).

Dans un contexte similaire, la définition proposée par Calvès (2009) se focalise sur la capacité de la créativité et la confiance en soi que confère le processus d'autonomisation aux individus. Le concept d'empowerment est global et revêt plusieurs dimensions (Charlier, 2006 ; Kabeer, 2002 ; Varghese, 2011).

Ces dimensions peuvent être individuelles comme « l'aspect émancipatoire des femmes » ou collectives mettant l'accent sur « l'organisation de la société » (Charlier, 2006). L'autonomisation devrait donc engendrer des changements durables dans les conditions de vie des femmes, à la fois au sein de leur famille et de leur communauté, ainsi que dans l'ensemble de la société, comme le souligne Batliwala (2007).

En outre, Varghese (2011, p. 40) révèle que l'autonomisation représente autant de dimensions telles que : économique, socioculturelle, juridique, politique, familiale ou interpersonnelle, et psychologique. Il ajoute

que, « ces dimensions sont très étendues et, à l'intérieur de chaque dimension existent des sous-domaines dans lesquels les femmes peuvent être habilitées ». Dont la dimension cernée par notre recherche et celle économique.

L'autonomisation économique se réfère à la capacité des individus, qu'ils soient hommes ou femmes et qu'ils se trouvent dans des conditions de pauvreté, à participer activement au processus de croissance. Cela se réalise dans des conditions qui reconnaissent la valeur de leurs contributions, respectent leur dignité et leur permettent de négocier une distribution plus équitable des bénéfices issus de cette croissance (Eyben et al., 2008, p. 9-10).

Alors que l'autonomisation économique des femmes est l'un des principaux objectifs du développement durable pour atteindre les avancements économiques et sociaux. De nombreuses définitions ont été suggérées à cet égard, sachant qu'il n'existe pas de démarche universelle apte à unifier la définition de l'autonomisation économique des femmes. Dans cette partie, on va essayer de conceptualiser ce terme qui a plusieurs facettes complexes.

L'ONU-Femme annonce que l'autonomisation économique représente le chemin le plus fiable vers l'égalité des sexes, l'élimination de la pauvreté et une croissance économique inclusive (cité par Yattara, 2017). On peut déduire de cette définition que l'autonomisation économique cible les populations pauvres ou en situation vulnérable pour les ressortir de cet état vers le progrès économique.

Tout cela, c'est à travers le principe d'égalité du genre qui favorise l'équité sociale et la dignité des individus. Jouglard (2010, p. 11) est parvenue à déterminer l'autonomisation individuelle et celle collective en prétendant la définition suivante : l'autonomisation, ou empowerment, se réfère au processus d'augmentation du pouvoir individuel et collectif des membres de la société. Cela implique une amélioration des capacités à prendre des décisions, à influencer le cours de sa propre vie, ainsi qu'à exercer un contrôle sur les ressources matérielles et immatérielles.

La majorité des institutions internationales de développement durable déclarent que l'autonomisation économique est un outil motivant pour la femme à accéder aux ressources financières et non financières, à créer la richesse et à atteindre le marché d'emploi. Ceci lui confère le pouvoir de décision, la capacité de faire les choix et l'autonomisation vis-à-vis son conjoint pour assurer son émancipation.

Restant au même angle, cette autonomisation permet à la femme d'accroitre sa capacité de négociation et de mettre à niveau des actions sur les besoins de base notamment la scolarisation, la santé et l'alimentation des enfants. Vu que ceux-ci impactent directement la croissance économique et la réduction de la pauvreté (OCDE, 2011).

Les recherches ont démontré que l'augmentation des revenus des femmes entraine naturellement des bénéfices pour le ménage en termes

d'alimentation, de santé, d'éducation et de bienêtre global, comme en attestent les travaux de Blumberg (2005), Pitt et Khandker (1998) et l'USAID (2006). Dans le même ordre d'idées, Golla et al.(2011) affirme que l'autonomisation économique des femmes revêt une importance cruciale à la fois pour la concrétisation des droits des femmes et pour la réalisation d'objectifs de développement plus vastes, tels que la croissance économique, la diminution de la pauvreté, l'amélioration de la santé, de l'éducation et du bienêtre.

Toutefois, une étude effectuée par Acharya et al (2010) sur le Népal démontrent que l'autonomie décisionnelle de la femme est positivement corrélée avec des critères spécifiques tels que, l'âge, le nombre d'enfants vivant et son travail. Ainsi, la femme qui génère un salaire demeure capable à assurer une source additionnelle de revenu qui lui permet d'atteindre son bienêtre social et son autonomisation économique. L'étude a aussi montré que les femmes qui se situent aux milieux ruraux disposent moins d'autonomie à cause de plusieurs contraintes liées à la géographie sociale et à l'exclusion sociale et financière.

Néanmoins, comme le souligne le PNUD (2008), l'autonomisation économique englobe la création d'emplois plus attrayants et plus abondants pour les femmes dans tous les secteurs, la promotion d'un environnement commercial favorable aux femmes entrepreneures, ainsi que le développement d'un secteur financier proposant aux femmes une diversité de produits et de services répondant à leurs besoins spécifiques.

Plus précisément, l'importance de l'autonomisation économique réside dans l'assurance des compétences, des aptitudes, des ressources, et de l'accès à des revenus et à des moyens de subsistance stables et durables (Lutz, 2005). Donc, l'implication des femmes dans des activités génératrices de revenus contribuera à leur autonomisation. En ayant accès aux ressources, une femme peut renforcer sa capacité de négociation, ce qui lui confère un meilleur contrôle sur ses décisions et ses choix de vie (West, 2006).

Dans la même optique, la promotion de l'entrepreneuriat féminin fait partie de l'autonomisation économique des femmes d'après le cinquième objectif du développement durable, qui tient compte l'étendue de favoriser l'égalité des genres et l'émancipation des femmes (Nations Unies, 2019).

De ce point, on peut conclure que si les femmes rejoignent le domaine entrepreneurial, elles peuvent non seulement acquérir la capacité de posséder et de contrôler les ressources existantes à travers leur engagement dans les activités génératrices de revenus, mais aussi d'accéder à des revenus indépendants (Sabeh et Moh'd, 2007) afin de permettre à ces femmes d'atteindre une plus grande autonomie économique, de briser le cycle de la pauvreté et de contribuer de manière plus visible aux sphères politique, économique et culturelle, comme le souligne le Département de développement international (2007).

Comme nous avons indiqué précédemment, cette section est attribuée aux approches théoriques des deux concepts clés, nous allons par la suite essayer de rechercher les liens de contribution entre l'innovation sociale et l'autonomisation économique des femmes, par le biais d'un survol des travaux empiriques menés par les différents chercheurs.

2.   L'innovation sociale : une option concrète pour l'autonomisation des femmes ?

Aujourd'hui les femmes ont pu atteindre un niveau dit assez intéressant en autonomisation. Si on retient l'idée qu'une femme a le droit d'accès à l'emploi ou à une activité qui lui génère du revenu, c'est un pas essentiel pour imposer son statut dans la société et pour déclarer son indépendance vis-à-vis son conjoint. Autrement dit, l'intégration des femmes dans les marchés et leur accès illimité aux ressources nécessaires sont autant de facteurs qui favorisent à la fois, le potentiel productif dans les différents domaines d'activités, et la cohésion sociale et la solidarité entre les familles, les territoires et les générations.

Compte tenu des particularités théoriques abordées dans la première section, nous avons soulevé que le point commun direct entre l'innovation sociale et l'autonomisation économique des femmes est celui de la promotion de l'entrepreneuriat féminin. Car, l'innovation sociale est composée de plusieurs structures, dont l'autonomisation est l'une de celles-ci.

En même temps, le développement de l'entrepreneuriat féminin constitue une partie intégrante de l'autonomisation économique des femmes suivant le cinquième objectif de développement durable. De ce constat, on ne peut que confirmer que l'innovation sociale est un tremplin de l'autonomisation économique des femmes à travers la favorisation et la relance de l'entrepreneuriat social.

« Entreprendre » est un acte spirituel et dynamique motivant la femme à créer une activité génératrice de revenus, un style de vie sur mesure qui lui correspond, et par conséquent son autonomisation, car le fait qu'elle rejoint l'élan entrepreneurial lui requiert le passage d'un état passif à une démarche active, même proactive.

C'est vrai que le Covid-19 a impacté la croissance économique en entier et en international sans précédent à cause de la régression de l'aventure entrepreneuriale en plusieurs secteurs comme l'évènementiel, l'hébergement et la restauration, le transport et d'autres en industries. Mais, une perte d'emploi, une sous-utilisation de la main-d'œuvre féminine, une exposition de celle-ci au danger du virus dans la période de la pandémie (la surreprésentation des femmes dans les secteurs les plus touchés comme la médecine, le soutien médical, nettoyage ; etc.), et une exacerbation des effets économiques pour les

femmes sont autant de circonstances qui n'ont pas empêché les femmes d'être créatives pour sortir de la crise.

Dans ce sillage, le Maroc est l'un des pays qui ont lutté contre l'épidémie Covid-19 en relançant des produits de terroir développés et préventifs dans un contexte d'innovation sociale, et en satisfaisant les besoins actuels et potentiels. Sachant qu'aujourd'hui les gens sont devenus de plus en plus exigeants en matière de choix et d'achat des produits biologiques et naturels, contenant une grande valeur nutritionnelle, voire bénéfique pour le renforcement du système immunitaire. Le mouvement coopératif féminin s'intervient pour répondre à ces exigences en inventant des produits particuliers à usage alimentaire et corporel (gels antiseptiques, savons, huiles, herbes médicinales à base d'argan et autres produits alimentaires), et en créant des opportunités d'emploi qui contribuent au développement territorial.

D'ailleurs, ces coopératives féminines ont non seulement promu ces produits au niveau des grandes et moyennes surfaces, mais elles ont aussi opté pour la promotion électronique (l'utilisation des technologies de l'information et de la communication TIC et les réseaux sociaux comme alternatives pour effectuer les opérations commerciales) de ces produits de terroir dans le but de se remettre en relation directe avec les consommateurs nationaux et internationaux.

En se focalisant sur ce dernier point, Beena et Mathur (2012, p. 166) ont démontré dans leur article que : « l'enseignement des TIC a également contribué à réduire l'écart entre les sexes dans les pays en développement en autonomisant les femmes par le biais de l'éducation ». C'est-à-dire que l'essor des technologies demeure une opportunité pour la femme à fournir des informations de grande valeur qui peuvent en servir, voire des avantages immédiats et tangibles à faible cout comme la gestion des ressources financières.

Dans le même contexte, la commercialisation des produits et des services nécessite actuellement le e-commerce et la digitalisation vu l'évolution de la pénétration d'internet et la possibilité d'accès aux réseaux sociaux.

Tous ces instruments sont devenus aujourd'hui une forme d'innovation sociale exigée par le progrès et les changements complexes mondiaux. Dans ce cadre, la Direction générale Coopération belge au développement et Aide humanitaire (DGD) poursuit la digitalisation pour encourager l'autonomie des femmes, atteindre l'égalité du genre, et enregistrer « zéro faim ».

Dans cette perspective, la DGD s'oriente vers les avancées technologiques numériques pour s'ouvrir à de nouvelles réflexions sur les liaisons entre l'autonomisation des femmes et la digitalisation en matière de la sécurité alimentaire. Ainsi, « un accès et un usage des femmes aux moyens de financement digitalisés tels que les microcrédits et la banque en ligne sont

un enjeu central, car aujourd'hui, la digitalisation des services financiers est de plus en plus importante dans le développement de l'agriculture » (Woitrin, 2017). Autrement, la DGD déclare que les agricultrices qui optent pour la digitalisation dans leurs activités agricoles sont au point d'augmenter leurs revenus et devenir autonomes financièrement.

Au Maroc, le projet « Min Ajliki » est lancé en 2013 par l'Association pour la Promotion de l'Education et de la Formation à l'étranger (APEFE). Ce projet a pour vocation la formation des femmes pour bien utiliser les outils digitaux au marketing afin d'assurer leur émancipation économique à travers un programme de soutien à l'entrepreneuriat féminin.

De même, le projet s'appuie sur l'accompagnement pour concrétiser les projets d'entreprises des femmes et sur l'usage des TIC pour tirer profit des avantages permettant la facilitation et l'allègement des tâches attribuées à la production, et la libération du temps pour d'autres activités. Les femmes rurales sont l'un des publics cibles par ce projet à côté des femmes exerçant déjà une activité dans le secteur informel et ayant la volonté de se structurer davantage pour passer au secteur formel.

Beena et Mathur (2012) ont effectué une étude sur « le rôle de l'éducation des TIC pour l'autonomisation des femmes », l'échantillon choisi à ce propos est de 200 femmes indiennes stagiaires et 30 instructeurs de différentes organisations gouvernementales et non gouvernementales du district Jaipur, dont les résultats de l'étude ont révélé que 92% des femmes ont annoncé que l'enseignement des TIC participe à leur autonomisation économique, du fait qu'elles les aident à procurer et à augmenter leurs revenus mensuels, elles leur offrent des emplois et des opportunités de fusion avec les grandes industries. Finalement, elles les rendent économiquement saines et source d' autres types d'autonomisations.

En résumé, nous pouvons affirmer que nombreuses sont les dimensions qui rapprochent les concepts de l'autonomisation économique des femmes et l'innovation sociale. La majorité des travaux convergent vers l'existence d'une relation de contribution directe entre les deux concepts du côté de l'innovation sociale qui renforce les possibilités de l'autonomisation. C'est ainsi que nous avons dressé le modèle de recherche hypothétique dans la figure ci-dessous.

Figure 1. Modèle de recherche hypothétique
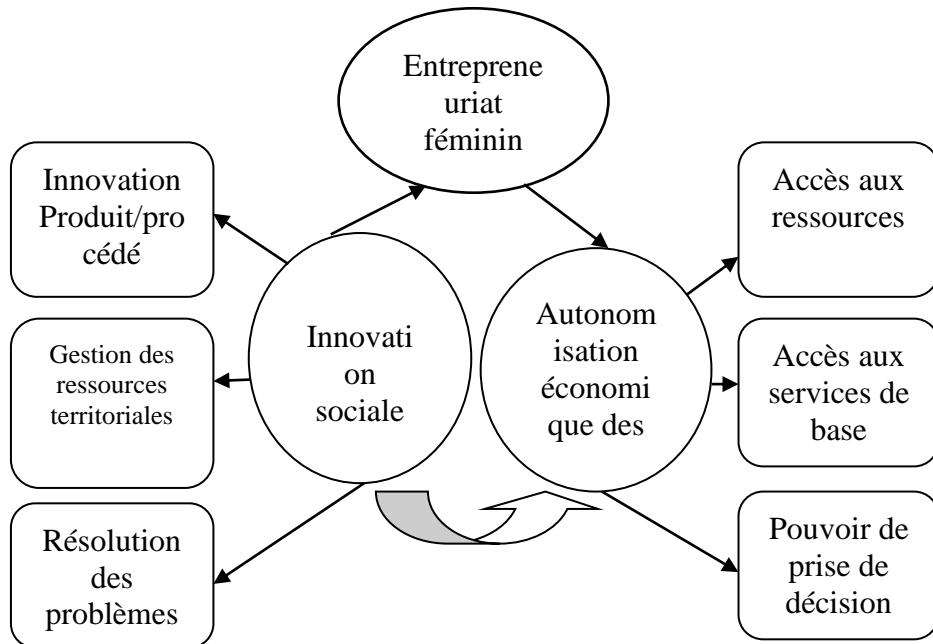
Source : *Auteurs*

Conclusion

Comme indiqué au précédent, nous avons pu aborder des fondements théoriques concernant les deux concepts clés ; l'innovation sociale et l'autonomisation économique des femmes. Pour conclure que l'innovation sociale représente des approches et pratiques renouvèlements créés, et de nouvelles manières à vocation économique et sociale pour non seulement résoudre les problèmes sociaux, mais aussi pour créer le changement social et améliorer les conditions de vie à l'échelle individuelle et collective.

L'autonomisation économique des femmes est une composante principale des champs structurant de l'innovation sociale. Ainsi, l'entrepreneuriat féminin fait partie des deux processus. On peut en déduire que l'innovation sociale est un tremplin de l'autonomisation économique des femmes à travers la promotion de l'entrepreneuriat féminin et l'augmentation des opportunités d'accès aux ressources nécessaires.

En nous basant sur une recherche documentaire basée sur le survol des travaux théoriques et empiriques, nous avons pu repérer les liens de causalité qui retrace une relation de contribution de l'innovation sociale à l'autonomisation économique des femmes. Ceci, pour promouvoir le développement durable, et l'inclusion sociale et financière. D'un autre angle, les TIC, le e-commerce, et la digitalisation sont autant de formes d'innovation sociale, imposé par le progrès et les changements complexes mondiaux. Ces

instruments permettent aux femmes non seulement une opportunité de leur autonomisation économique, mais aussi un tas d'avantages pour concrétiser et gérer leurs projets d'entreprises.

À ce propos, nous avons constaté que l'innovation sociale joue un rôle crucial dans l'autonomisation économique des femmes. Cette observation nous a incités à élaborer un modèle de recherche basé à la fois sur la théorie utilisée et sur les observations de la réalité. Dont l'étape à venir sera un test de ce modèle auprès des coopératives féminines pour vérifier sa fiabilité, son adéquation et les relations supposées être entre les concepts. Il convient de noter que les conclusions déduites ne doivent pas être généralisées, car le test empirique peut confirmer ou non les propositions maintenues.

Conflit d'intérêts : L'auteur n'a fait état d'aucun conflit d'intérêts.

Disponibilité des données : Toutes les données sont incluses dans le contenu de l'article.

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