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# Contents

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Efstathios Dimitriadis, Thomas Anastasiades, Despoina Karagiannidou, Maria Lagaki

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# Creativity and Entrepreneurship: The role of Gender and Personality

**Efstathios Dimitriadis[1*], Thomas Anastasiades[1], Despoina Karagiannidou[1], Maria Lagaki[1]**

[1]Eastern Macedonia and Thrace Institute of Technology, Department of Business Administration, Master of Business Administration, Greece

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ABSTRACT

**Purpose**
This study examines the relationship between personality traits and creative behaviour, in an entrepreneurial environment. Moreover, an attempt was made to define the effect of gender on creative behaviour.

**Design/methodology/approach:**
Even though there are more women than men in Europe, female entrepreneurs represent only a third of the EU's self-employed. Additional factors, such as reconciling business and family, make entrepreneurship a less attractive option for them than for men. In order to achieve the objectives of this study research was conducted with the use of a structured questionnaire, during the months of February and March of 2017. The final sample size consists of 180 small and medium enterprises, from the region of North Greece. The instrument for content and construct validity was examined. Then, the hypotheses were examined using ANOVA, Correlation and Regression analysis.

**Findings:**
The results showed that "Agreeableness", "Openness to Experience", "Conscientiousness", and "Extraversion" are positively related with "creative behaviour" of entrepreneurs. However, there is no strong evidence to predict the level of creativity by the personality traits. On the other hand, "Neuroticism" is negatively correlated with creativity, but this relation is not significant. The results also indicate a statistically significant but not strong relation among the traits "Agreeableness", "Openness to Experience" and the performance of the enterprise.

**Research limitations/implications**:
There are some limitations in the study that can be addressed in the future; primarily, the study used subjective measures of firm performance instead of objective measures. Moreover, the sample size was small. A number of policy implications arise from this study. There needs to be a stronger recognition that the stereotypical role of women as sole careers is preventing future growth in female entrepreneurship. If the objective of future policy is to increase the number of women entrepreneurs, particularly in the current climate of global financial crisis and economic recession, it is imperative that we take account of the motivations of women who become entrepreneurs. Once the potential role of personality traits has been more clearly established, this can be used to inform policy making and decision making.

**Originality/value**:
To the best of our best knowledge, this is the first attempt at estimating the effects of gender and personality on creativity and entrepreneurship in Greece.

**Keywords:**
Entrepreneurship, Personality, Gender, Big Five Model



## 1. Introduction

Entrepreneurship is a construct that is seen by some people to relate to a set of personal characteristics, a set of behaviors by others and a combination of both of these possibilities by yet another group (Llewellyn and Wilson, 2003). Entrepreneurship means different things to different people. Conceptually and in practice, the term hints of no stereotypical model (Babu, et al., 2013). Entrepreneurship can be defined as the process of creating value for business and social communities by bringing together unique combinations of public and private resources to exploit economic, social or cultural opportunities in an environment of change (Fillis, 2010). Amlanjyoti et al. (2008) define entrepreneurship as the professional application of knowledge, skills and competencies and/or of monetizing a new idea, by an individual or a set of people, by launching an enterprise

†Corresponding Author: Efstathios Dimitriadis
E: edimit@teiemt.gr
*DOI:* 10.25103/ijbesar.111.01

de novo or diversifying from an existing one (distinct from seeking self employment as in a profession or trade), thus to pursue growth while generating wealth, employment and social good. According to Babu et al. (2013) from the perspective of economic functions, the three crucial characteristics of entrepreneurial activity are: risk taking, innovation and venturing into new business activities for profit.

A change in the economy has been identified recently, moving from knowledge-based activities to creativity, innovation, entrepreneurship and imagination (Van den Broeck et al., 2008; Oke et al. 2009). Increasing globalization and technology effects have resulted in more business opportunities but the marketplace has also become more crowded and competition has increased (McMullan and Shepherd 2006).

Entrepreneurship occurs in all types and sizes of organizations, from the domestic microenterprise to the global corporation (Fillis, 2010). Creativity is identified by the ability to create, bring into existence, to invent into a new form, to produce through imaginative skill, something new. Creativity is not the ability to create out of nothing, but the ability to generate new ideas by combining, changing, or reapplying existing ideas. Some creative ideas are astonishing and brilliant, while others are just simple, good practical ideas that no one seems to have thought of yet. Bilton (2007) said that creativity enables the entrepreneur to act on opportunities in ways that can result in competitive advantage for the organization. It can provide the basis for innovation and business growth, as well as generally impacting positively on society. In the middle of the last century personality traits became both fashionable and popular as an explanation of both entrepreneurial behaviors and intentions (Llewellyn and Wilson, 2003). Personality traits are constructs to explain regularities in people's behavior, and help to explain why different people react differently to the same situation (Cooper, 1998). Entrepreneurial personality is crucial for the individual decision to start up a business and the subsequent entrepreneurial activity. Schumpeter (1934), for example, identified entrepreneurs as extraordinary individuals defying conventions, originating innovations, and thus promoting creative destruction. Entrepreneurs recognize and exploit entrepreneurial opportunities (Kirzner, 1973) and they are willing to take risk and uncertainty (Knight, 1921). The degree to which entrepreneurship affects the economy depends on numerous factors, including the quality, gender composition, and type of entrepreneurial activity. Gender equality and female entrepreneurship are key factors in economic development. The number of female entrepreneurs across the world has been gradually growing in the recent years. Researchers and policy makers have been paying more attention to female entrepreneurship (Nedelcheva, 2012).

The Specific Objectives of the Study Are:

- Measurement of the impact of creativity in the success of enterprise;
- Assessment of the effect of personality traits in creative behavior;
- Evaluation of mediation effect of gender, in creative behaviors.

## 2. Literature Review and Research Hypotheses.

Innovation and creativity have become critical skills for achieving success in developed economies. While creativity is the ability to produce new and unique ideas, innovation is the implementation of that creativity - that's the introduction of a new idea, solution, process, or product (Sokolova, 2015).

Creativity and innovation within well-run companies have always been recognized as a sure path to success. Stimulating creativity and exploring completely new and unknown before territories results in an **increase in the productivity of the organisation**. Encouraging employees to think outside of the box and giving them time and resources to explore new areas for innovative ideas is the key to cost-effective business solutions. Creative ideas and innovative approaches can come from almost anywhere- from partners, customers, target groups, or employees (Sokolova, 2015). Researchers have predominantly agreed that creativity is a multidimensional construct, representing an individual's capacity to produce inventions, ideas, insights, restructuring, and products that can be evaluated as being aesthetic, social, scientific or technological value (Vernon, 1989).

Innovative entrepreneurial business people are increasingly integral to the stability and growth of developed economies. Many even say that the perpetuation of these developed economies depends on the success of their creative entrepreneurs (Adams, 2005).

The most productive businesses are those embracing creativity and inspire innovation. Incentivizing creative product and strategy development can help propel a business, with all employees actively seeking opportunities for further growth and innovation. Entrepreneurs should emphasize the importance of creativity and imagination (Adams, 2005). Thus, creativity may manifest itself in not just identification of opportunities but also in the implementation of those ideas. Generation of new ideas can thus be indicative of the individual's creativity. Individuals that can come up with new ideas for starting a business are more likely to have feasibility perceptions about opportunity recognition, and hence are likely to have greater entrepreneurial intentions (Duckworth et al., 2015).

Traditionally, it's argued that women have lower entrepreneurial intentions, but this study finds in the sample that creative women were more likely to have entrepreneurial intentions.

Understanding the pipeline of women entrepreneurs, through developing entrepreneurial intentions is important, and entrepreneurship education can play an important role in development of such intentions. Similarly, a bias remains about the creative abilities of women compared to men. In order to advance the involvement and engagement of women in the entrepreneurial process, an understanding of how entrepreneurial intentions are influenced by gender and creativity is critical. Thanks to two studies of undergraduate college students (one cross sectional and one three wave) (Sarfarazet al.,2014), we see the role of both gender and creativity in predicting entrepreneurial intentions. The results show that while gender has no direct effect on entrepreneurial intentions, it moderates the relationship between creativity and intentions, such that the relationship is stronger for women than for men (Duckworth et al., 2015).

The relationship between gender and creativity is unclear (Kaufman, et al., 2010; Stoltzfus et al., 2011). Yet, men continue to outnumber women in the domain of self-employment and entrepreneurship, where creativity can be essential in the entrepreneurial process.

Entrepreneurship is traditionally associated with masculine traits and image (Gupta, et al., 2009; Lewis, 2006), and such underlying stereotypes can influence entrepreneurial intentions among individuals (Gupta et al., 2008). Particularly, the dominance of a masculine stereotype associated with entrepreneurship may lead women to evaluate business opportunities less favourably (Guptaet al., 2014), as compared to men. This suggests that men with higher creativity perceptions will also have stronger feasibility perceptions about entrepreneurial careers, and thereby be more likely to perceive a strong congruence between their self-perception and an entrepreneurial role, making that option more desirable for men rather than for women.

Studies conducted in the majority of Western countries identify three main barrier-types to female entrepreneurship. First, the socio-cultural status of women, which identifies the primary role of women with family and domestic responsibilities and reduces the credibility of women intent on setting up businesses in a variety of ways. Then, the access to networks of information and assistance, which are often the main source of information and contacts, but which equally often comprise more or less overt mechanisms of gender exclusion (Aldrich et al., 1989). Finally, access to capital; whether women entrepreneurs apply to an institutional financier (a bank, a finance agency), a friend, a relative or even her spouse, they are likely to come up against the assumption that "women can't handle money". The relationship between gender and creativity is unclear.

The importance on focusing on personality factors in any comprehensive assessment of creative performance has been documented by several researchers (Feldhusen and Goh, 1995; Montgomery et al., 1992). Researchers in general agree that personality factors are related to performance on creative tasks (Runco and Albert, 1990; Mumford et al., 1993). Dacey (1989) identified multiple personality factors, such as flexibility, risk taking and tolerance to ambiguity related to creative performance. Several other researchers (Davis and Rimm, 1985; Woodman and Schoenfeldt, 1989) have extracted personality traits reflective of creativity as well.

From all the above-mentioned, the hypotheses defined are:

**H1**: There is a positive relationship among personality traits and creative behaviour;
**H2**: There is a positive relationship among personality traits and successful leadership;
**H3**: Creative behaviour positively affects the success of the enterprise;
**H4**: Women are more creative than men.

## 3 Research Methodology

### 3.1 Sample and Data Collection

In order to reach the objectives of this study, research was conducted during the months of February and March of 2017. A structured questionnaire was used as the research instrument. The target population of this study was Greek Enterprises and the final sample size consists of 180 small and medium enterprises, from the region of North Greece. 68% of the enterprises are very small (<10 employees), 24% are small (11-50 employees), while 8% are medium sized enterprises (51-250 employees). The 65% of entrepreneurs are males and 35% females. It is notable that 47% of entrepreneurs are university graduates and 41% hold postgraduate degrees. The biggest part of the enterprises (65%) is services, 18% commercials and 6% industrials.

### 3.2 Instrument Development

The instrument's development was based on extensive literature review and all the items which have been used, from previous studies, relevant to our work, were adopted. It consists of four parts with 60 items. The first part refers to general information about the enterprises and entrepreneurs; type of business, size, gender, age. The second and most important part evaluates the personality of entrepreneurs. The questionnaire consists of fifty statements and is adopted from the work of Goldberg (1993). The types of personality are: "Extraversion", "Agreeableness", "Conscientiousness", "Neuroticism" and "Openness to Experience". All of them are the famous Big-Five factors and a five-point Likert scale was used for the 50 statements (1=Very Inaccurate through to 5=Very Accurate). The big five personality characteristics offer a parsimonious taxonomy by which personality can be consistently defined and measured. The third part consists of five statements, adopted from Open textbooks (2015) and refers to the level of creativity of entrepreneurs. An agreement scale with five levels was used (1=completely disagree, 2=disagree, 3=neither agree nor disagree, 4= agree, 5=completely agree). The statements are: "I feel that I am good at generating novel ideas", "I am good at finding creative ways to solve problems", "I feel comfortable trying out new ideas", "I have opportunities to use my creative skills and abilities at work" and "My creative abilities are used to my full potential at work". Finally, the last part refers to the performance of enterprises and consists of only one item (the last three years, the profitability of your enterprise: 1=decreased, 2=is the same, 3=increased).

### 3.3 Validity and Reliability of Research Instrument

The process of validation of research instrument consists of three steps. In the first step, the instrument for content validity was examined. Then, a confirmatory analysis of dimensionality was carried out and finally, in order to examine the reliability of the factors the Index of Composite Reliability was calculated.

Content Validity refers to the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991). As mentioned in the previous section all the variables, were gathered from the most relevant literature. After the construction of an initial pool of items, a pilot test involving a panel of experts (professors and professionals) was conducted and after feedback, the necessary changes were made to reach the final questionnaire.

For the fifty items of personality, a confirmatory factor analysis was undertaken in order to confirm the dimensional structure of the model, as well as the internal consistency (Ping, 2004). The LISREL 8.80 statistical package was used and the factorial model was evaluated for Overall and Measurement model fit. A statistical non significant value of $\chi2$- statistics (p-value> 0,05), a value of Root Mean Square Error of Approximation (RMSEA) less than 0,1 and a value of Comparative Fit Index (CFI) and Goodness of Fit Index (G.F.I) greater than 0,90 indicate a good overall fit of the data in the proposed model (Kline, 1998). Significant path coefficients, Composite Reliability (C.R) greater than the benchmark of 0.7 and Average Variance Extracted (A.V.E) higher than 0.5 (Fornell and Larcker, 1981) indicate good fit of the data in the measurement model.

RMSEA, GFI and CFI with values of 0,049, 0,93 and 0,98 respectively are sufficient. On the contrary, the value of $\chi2$-statistics is significant (p-value=0,0001). However, because this happens almost always in big samples, the index $\chi2$ /d.f was used, the value of which (2,01) is bigger 1 and smaller 3, as proposed by Hair et al. (1995). All path coefficients are statistically significant and all C.R of constructs have a higher value than 0,7, indicating sufficient internal consistency. Furthermore, the A.V.E for all constructs is much higher than 0,5, the suggested minimum limit.

**Table 1.** Confirmatory Factor Analysis for Personality Traits

| Personality Traits | C.R | A.V.E |
|---|---|---|
| Extraversion | 0,900 | 52,1% |
| Agreeableness | 0,885 | 50,1% |
| Conscientiousness | 0,917 | 53,1% |
| Neuroticism | 0,927 | 56,3% |
| Openness to Experience | 0,906 | 51,2% |

$x^2$= 2341,65df = 1165$x^2$/df =2,101
R.M.S.E.A =0,049
C.F.I = 0,93
G.F.I = 0,98

For the five items of creativity, confirmatory factor analysis indicated a very good fit of the data to the proposed model, as shown in table 2.

**Table 2.** Confirmatory Factor Analysis for Creative Behaviour

| Creative Behaviour | C.R | A.V.E |
|---|---|---|
| Creativity | 0,875 | 54,1% |

$x^2$= 5,35df = 5 p-value= 0,37343 $x^2$/df =1,071
R.M.S.E.A =0,020
C.F.I = 0,99
G.F.I = 0,98

## 4 Results

### 4.1 Descriptive statistics

The means and standard deviations for all the variables used in the analyses are presented in table 3.

**Table 3.** Basic Measures

| | Scale | Mean | Standard Deviation |
|---|---|---|---|
| Extraversion | 1-5 | 3,55 | 0,7208 |
| Agreeableness | 1-5 | 4,21 | 0,5414 |
| Conscientiousness | 1-5 | 4,01 | 0,7098 |
| Neuroticism | 5-1 | 2,86 | 0,6568 |
| Openness to Experience | 1-5 | 3,67 | 0,5784 |
| Creativity score | 1-5 | 2,78 | 0,6234 |

Observing the results of the above table, it is understood that the entrepreneurs in the sample tend to be marginally "extroverts'", "open to experiences" and "neurotics". On the other hand, they are characterized as "agreeable'" and "conscientious". The score of creativity is lower than the average score of three, indicating that the performance in creativity is not sufficient.

Table 4 presents the success of the enterprises in the sample. In the previous three years, 16% of them experienced a decrease in profitability, 39,5% experienced stability and 44,5% an increase in profitability.

**Table 4.** Success

| Profitability | Percent % |
|---|---|
| Decreased | 16,0% |
| Same | 39,5% |
| Increased | 44,5% |
| **Total** | **100,0%** |

### 4.2 Testing of Hypotheses

From the analysis of the data it is understood that Gender is a factor of differentiation for the traits of Personality. There are statistically significant differences between males and females in "Extraversion", "Agreeableness", "Neuroticism" and "Openness to Experience". In all these dimensions of personality the level of females are better than for males (Table 5).

**Table 5.** Analysis of Variance (Personality traits-Gender)

| | Gender | | | |
|---|---|---|---|---|
| Personality traits | Male | Female | F | Sig. |
| Extraversion | 3,43 | 3,67 | 5,004 | 0,027* |
| Agreeableness | 4,11 | 4,40 | 11,690 | 0,001** |
| Conscientiousness | 4,03 | 3,93 | 0,767 | 0,382 |
| Neuroticism | 3,05 | 2,50 | 32,899 | 0,000** |
| Opennessto Experience | 3,58 | 3,79 | 4,942 | 0,027* |

*significant at 1% level. ** significant at 5% level.

In order to test the first hypothesis, a correlation analysis was performed. The results indicated that "Extraversion", "Agreeableness", "Conscientiousness" and "Openness to Experience", are positively related with "Creative Behaviour". In contrast, "Neuroticism" is not related with "Creative Behaviour" (Table 6). Thus, the first hypothesis is not fully supported.

**Table 7.** Correlations for Personality traits and Profitability

| Personality Traits | Profitability |
|---|---|

| | |
|---|---|
| Extraversion | 0,119 |
| | 0,144 |
| Agreeableness | 0,346 |
| | 0,000* |
| Conscientiousness | 0,105 |
| | 0,198 |
| Neuroticism | -0,085 |
| | 0,301 |
| Openness to Experience | 0,181 |
| | 0,027** |

*significant at 1% level. ** significant at 5% level

The third hypothesis was tested with the use of regression analysis where the dependent variable was "Success" and predictor variable "Creative behaviour".

**Table 7.** Regression Analysis

| | B | Beta | t | Sig. |
|---|---|---|---|---|
| Constant | 0,341 | | 3,254 | 0,001* |
| Creative Behaviour | 0,838 | 0,757 | 14,154 | 0,000 |
| F = 200,338 Sig. =0,000 R- square = 0,573 =57,3% | | | | |

Dependent Variable: Success (Profitability) *significant at 1% level.

Creative behaviour positively affects success (Beta=0,757 and sig.=0,000<0,05) and explains the 57,3% variance in success. Therefore, the third hypothesis is fully supported.

Finally, the fourth hypothesis, that women are more creative than men, was tested with analysis of variance (ANOVA). The results from ANOVA fully support the hypothesis, because the creative behaviour of females is significantly bigger than the creative behaviour of males (Table 8).

**Table 8.** Analysis of Variance (Creative Behaviour-Gender)

| | Gender | | | |
|---|---|---|---|---|
| | Male | Female | F | Sig. |
| Creative Behaviour | 2,60 | 3,28 | 15,004 | 0,001* |

*significant at 1% level.

Table 9 presents a summary of all hypotheses which have tested.

**Table 9.** Hypotheses Testing Results

| Hypotheses | Decision |
|---|---|
| H1: There is a positive relationship among personality traits and creative behaviour | Partially supported |
| H2: There is a positive relationship among personality traits and successful leadership | Partially supported |
| H3: The Creative behaviour affects positively the success of the enterprises | Fully supported |
| H4: Women are more creative than men. | Fully supported |

## 5 Findings and Conclusions

### 5. 1 Findings

The primary objective of this research is to define the impact of personality traits in entrepreneur's creativity, in organizational settings. The results confirmed some of the hypothesized relationships. The results particularly showed that "Agreeableness", "Openness to Experience", "Conscientiousness", and "Extraversion" are related positively with "creative behaviour" of entrepreneurs. However, there is no strong evidence to predict the level of creativity by the personality traits. On the other hand, "Neuroticism" is negatively correlated with creativity, but this relation is not significant. The results also indicated a statistically significant but not strong relation among the traits "Agreeableness", "Openness to Experience" and performance of enterprise.

### 5.2 Managerial Implications

A number of policy implications arise from this study. There needs to be a stronger recognition that the stereotypical role of women as seeking sole careers is preventing future growth in female entrepreneurship. The future policy objective is to increase the number of women entrepreneurs, particularly in the climate of the global financial crisis and economic recession, it is fundamental to take account of the motivations of women who become entrepreneurs. Once the potential role of personality traits has been more clearly established, this can be used to inform policy making and decision making.

### 5.3 Limitations and Proposals for further research

In spite of many useful findings, there are some limitations in the study that future researchers can address. Primarily, this study used subjective measures of firm performance instead of objective measures. Further, the authors used the convenient sampling technique for data collection due to which results cannot be generalized to the overall population. Moreover, the sample size was small. In the future, researches should undertake such studies with a large sample size and data should be collect from multiple cities across the country.



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International Journal of Business and Economic Sciences Applied Research

# The Effect Of External Debt On Economic Growth In Sub-Saharan Africa

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# The Effect of External Debt on Economic Growth in Sub-Saharan Africa

**Bernardin Senadza[1], Agbemavor Korsi Fiagbe[2] and Peter Quartey[3]**

[1]Department of Economics, University of Ghana, Ghana
[2]Department of Economics, University of Ghana, Ghana
[3]Department of Economics, University of Ghana, Ghana

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ABSTRACT
**Purpose**
This paper examines the effect of external debt on economic growth in Sub-Saharan Africa (SSA) in view of an upsurge in the level of external debt in many countries on the continent.
**Design/methodology/approach:**
The paper uses annual data for 39 SSA countries from 1990 to 2013 and employs the System Generalised Methods of Moments (GMM) estimation technique.
**Findings:**
The paper finds that external debt negatively affects economic growth in SSA. Categorization of countries based on per capita income however does not affect the external debt-growth nexus, neither does there exist a non-linear relationship between external debt and economic growth.
**Research limitations/implications**:
The finding of a negative relationship between external debt and growth does not necessarily imply that SSA countries should cut back on foreign borrowing in other to boost growth. Rather, given the huge savings gaps in some of the countries, what governments in SSA must do is to ensure that the foreign loans are invested in projects that would eventually generate enough returns to amortize the debt.
**Originality/value**:
Not only does the present paper extend to more recent data but we also apply one of the frontier econometric techniques - the system GMM approach - to unravel the external debt-economic growth dynamics in SSA.



## 1. Introduction

Economic growth and development is a major goal of most developing countries; hence resources are mobilized from various sources including external borrowing for investment into viable projects for growth acceleration. Sustainable economic growth is a predominant concern for all countries, especially developing economies that frequently face burgeoning fiscal deficits mainly driven by higher levels of debt service, particularly external debt servicing and widening current account deficits (Reinhart et al., 2012). According to Atique and Malik (2012), external debt constitutes a greater share of the public debt structure in developing countries. Reliance on external borrowing is not only rationalized on the grounds that excessive domestic borrowing can lead to financial instability and crowd out the private sector (Panizza et al., 2010) but also, as argued by Todaro and Smith (2006), developing countries in their early stages of development need to borrow externally because of inadequate domestic capital for investment.

The Harrod-Domar growth model[1] has been the traditional inspiration for development economists in explaining the importance of external borrowing in closing the savings-investment gap in developing countries. Krugman (1988), asserts that debt servicing obligations cause distortions in an economy and hence discourages investment and economic growth. Eaton (1993), on the other hand, argues that external debt is a complement to domestic savings and investment, and thus promotes growth. Several hypotheses have been put forward on the adverse effects of external debt on developing countries' growth. They are the Debt Overhang Hypothesis, the Crowding-Out Effect, the Liquidity Constraint Hypothesis, and the Debt Laffer Curve Theory. Empirical evidence on the debt- growth nexus is mixed. While some studies (Reinhart and Rogoff, 2010; Butts, 2009; Hameed and Chaudhary,

[1] The Harrod-Domar model assumes that economic growth occurs through capital accumulation in form of savings.

†Corresponding Author: Bernardin Senadza
E : bsenadza@ug.edu.gh
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2008; Were, 2001; Iyoha, 1999; Fosu, 1999; Deshpaned, 1997; Elbadawi et al., 1996) have established a negative relationship between external debt and economic growth, others have confirmed a positive relationship (Jayaraman et al., 2008; and Warner, 1992). Yet others find no correlation between debt and growth (Frimpong and Oteng-Abaye, 2003; Afxentiou and Serletis, 1996; Chowdhury, 1994; Cohen, 1993). The balance, however, appears to tilt in the negative direction.

The external debt levels of SSA countries have been on the rise in the past two decades, generating concerns among analysts and policy-makers about a looming debt distress threatening the region. While Africa's current external debt ratios appear manageable, the rapid growth in several countries is of concern (UNCTAD, 2016).[2] From a level of US$176.36 billion in 1990, the total external debt stock for SSA rose to US$235.94 billion in 1995, representing an increase from 58.2 per cent of the regional GDP to 72.0 per cent. For the years under study (1990-2013), the highest external debt-to-GDP ratio of 78.2 per cent was recorded in 1994. Standing at US$213.44 in 2010, the total external debt stock rose by US$55.63 billion to reach US$269.08 billion at the end of 2010. External debt witnessed a rapid build-up in the 3 years following, to reach US$367.51 billion in 2013 (World Bank, 2015).

Despite recent tightening of concessionary terms associated with bilateral and multilateral loans, Sub-Saharan Africa countries still continue to rely heavily on external borrowing for fiscal sustainability in order to accelerate economic growth. The impacts of the global economic downturn in the 1980s on developing economies, including the debt crisis, was such that the 1980s is often referred to as the "lost decade" for Africa (Iyoha, 1999). Even though many countries in the developing regions have managed to restore growth fortunes after the global economic distress of the 1980s, stagnation persisted in SSA into the first half of the 1990s as the burden of external debt lingered. Thus, the regional growth rate averaged 0.8 per cent per annum between 1990 and 1995, with many countries in the region experiencing negative growth. Growth improved in the years that followed, and stood at 3.4 per cent in 2000, rising further to 5.3 per cent by the end of 2010 (World Bank, 2015). UNCTAD (1998) attributes the protracted low growth of the region to the negative impact of external and internal developments, external debt burden, and structural and institutional setbacks and policy slippages.

Although generally exhibiting a rising trend, figure 1 shows us that the average growth rate for SSA was much lower between 1990 and 2000 compared to the decade following. The lower average growth between 1990 and 2000 was associated with much higher external debt-to-GDP ratios. Economic growth appears to have peaked for SSA in the last decade as the debt-to-GDP ratio decreased over time. Admittedly, the drastic decline in the debt-to-GDP ratio starting from 2001 was on account of many SSA countries subscribing to debt relief under the highly indebted poor countries (HIPC) initiative. The improved growth performance witnessed following the declining debt burden could be read as indicating the freeing up of additional resources through reduced external debt service obligations to propel growth.

That said, is the observed inverse correlation between external debt and economic growth a mere statistical fluke or is there a causal relationship between them?

This work investigates the effect of external debt on economic growth in SSA. A plethora of cross-country studies on external debt and economic growth exist in the literature, but the focus has predominantly been on developed countries (Geiger 1990; Reinhart and Rogoff, 2010). Studies covering developing economies are concentrated largely on Latin American countries and/or selected countries in Africa (Cohen, 1993; Warner, 1992; Afxentiou and Serletis, 1996; Desphane, 1997; and Butts, 2009). Empirical literature on SSA as a whole is scant, with the most recent studies being Fosu (1996; 1999) and Iyoha (1999). Fosu (1999), employing Ordinary Least Squares, estimated an augmented production function and found a negative relationship between external debt and growth in SSA. Similarly, Iyoha (1999) also found a negative effect of external debt on economic growth. While the above cited studies on SSA appear quite dated, not only does the present paper extend to more recent data but we also apply one of the frontier econometric techniques - the system GMM approach - to unravel the external debt-economic growth dynamics in SSA. Another value-added to our paper, which earlier studies on SSA failed to capture is to control for country-groupings based on per capita income. The rest of the paper is organized as follows: the next section provides a survey of the existing literature, followed by a discussion of the methodology in Section 3. The results are presented in Section 4, whilst Section 5 concludes with policy recommendations.

## 2. Literature Review

There is no unified theoretical and/or empirical explanation for the debt-growth nexus. The majority of theoretical propositions and empirical findings, however, reveal a negative relationship. The Harrod-Domar growth model provides the most basic direct relationship between savings and the rate of economic growth. According to the model, capital accumulation in the form of savings is essential for growth. External borrowing is, therefore, seen as capital helping to fill the financing gap in developing countries to promote growth (Eaton, 1993). In contrast, the literature has identified five channels through which external debt could affect growth negatively. First is the debt overhang hypothesis (DOH); Krugman (1988) defined debt overhang as "a situation in which the expected repayment on foreign debt falls short of the contractual value of the debt", whiles Borensztein (1990) asserts that debt overhang is "a situation in which the debtor country benefits very little from the return to any additional investment because of the debt service obligations." The DOH has two versions, namely, the narrow (traditional) and broader versions. The narrow perspective posits that

[2] In 2012, the World Bank observed that the eight African countries to have borrowed fastest since receiving debt relief - Ghana, Uganda, Senegal, Niger, Malawi, Benin, Mozambique, and São Tomé and Príncipe - could within a decade be back to pre-debt relief debt stock levels (UNCTAD, 2016).

debt overhang effect exists when investors expect an increase in the tax rate on returns to capital to service the debt, and consequently reduce their investment levels to avoid higher future taxes (Krugman, 1988; Sachs, 1989; Anyanwu, 1994). Neoclassical models posit that imposition of taxes for interest payment on external debt reduces individuals' disposable income and hence curtails savings of the taxpayer. The broader version of debt overhang argues that there is disincentive to invest when investors expect inflation, devaluation and other economic distortionary measures as means to service the debt. Debt rescheduling negotiations discourage investment since it raises uncertainty within the business environment (Claessens et al., 1996).

Second, there is a crowding-out effect of external debt. Debt service burden on government reduces public spending, including spending on social investments such as education and health which are crucial for economic growth. Moreover, heavy debt burden implies that government short term revenue must be used to service the debt, thereby crowding out public investment into the economy (Serieux and Yiagadeesen, 2001). Reduction in public investment can lead to a decrease in private investment since some private investments and public investments are complementary (Diaz-Alejandro, 1981; Taylor, 1983). Third, the growth effect of very high debt burden through the balance of payments account is referred to as liquidity constraint hypothesis (LCH) or import compression effect. Countries with high debt burden require enough inflow of foreign exchange so as to service the debt, especially when the nation's currency is not tradable in the international market. A situation where a country has low exports and capital inflows as well as inadequate reserves, debt servicing becomes problematic. The country may therefore resort to devaluation/depreciation and/or import restriction to attract foreign exchange inflow (Serieux and Yiagadeseen, 2001). Serieux and Yiagadeesen (2001), Ndulu et al., (1997) and Taylor (1983) have argued that import compression may lead to a situation where imported commodities, including inputs and capital goods, become expensive which can result in low growth.

Fourth, the debt-growth channel can be traced to the Direct Effect of Debt Hypothesis (DEDH) as hypothesized by Fosu (1996). Thus, Debt overhang, the crowding out effect and liquidity constraint hypotheses, suggest an indirect negative effect of external debt on economic growth through reductions in investment levels. However, Fosu (1996) argues that even if external debt is inconsequential in the savings and investment function, it can still influence output growth through its effects on factor productivity and investment mix. While a drag on investment could reduce growth, external debt may also stifle the productivity of the factors production and hence growth (Fosu 1999). Pattillo et al. (2004) argue that high debt burden creates uncertainty and thus biases investment towards short-term instruments to the detriment of long-term investments. Investors would therefore be reluctant to invest in projects with longer gestation periods because of higher uncertainty that characterizes the long-term. Lastly, the Debt Laffer Curve theory postulates a nonlinear relationship between debt and growth on the assumption that there is an optimal level of debt that promotes growth. Beyond that threshold further debt accumulation impedes growth. Cohen (1993) observes that the Debt Laffer Curve can be used to show the relationship between the face value of debt and investment, since the curve explains that as the outstanding debt increases beyond a certain threshold, repayment capacity begins to fall. In other words, when a country borrows to finance its budget deficit, it makes resources available for capital investment which could help promote growth objectives. However, borrowing beyond a certain level creates debt overhang and debt service challenges, and may retard growth (Pattillo et al., 2002).

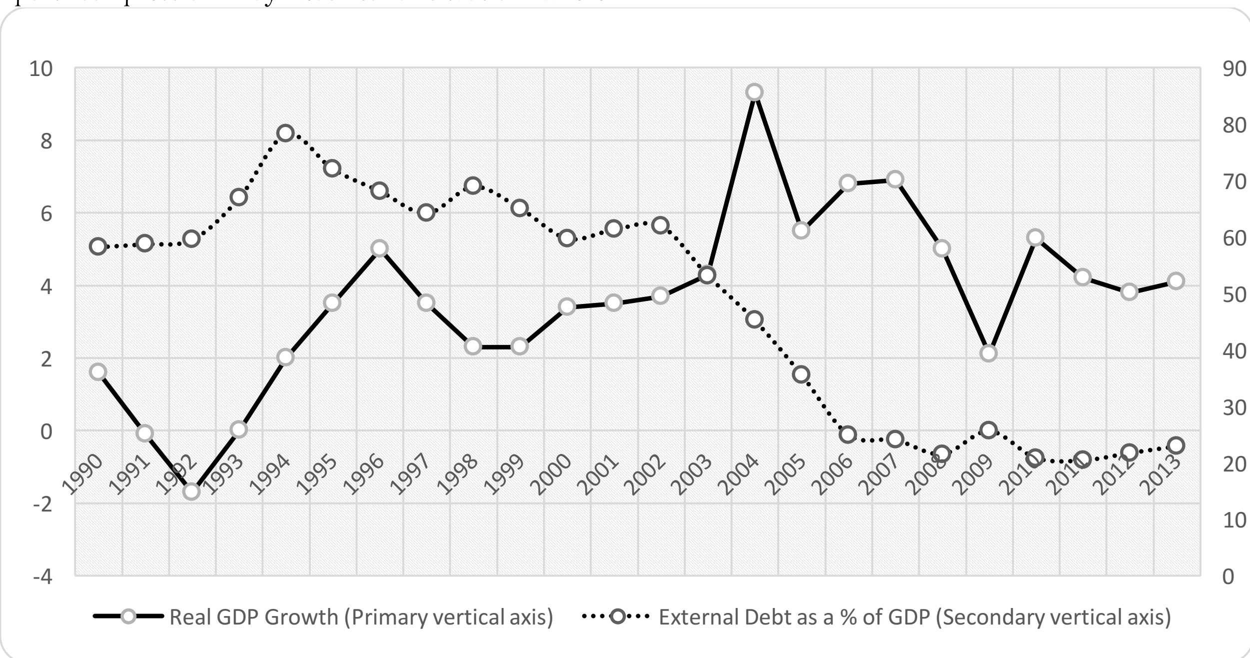


**Figure 1.** External Debt (% GDP) and GDP Growth Rate in Sub-Saharan Africa, 1990-2013, based on World Bank's World Development Indicators 2015

The empirical literature on the debt-growth relationship proffers mixed conclusions. The works of Warner (1992) and Jayaraman et al. (2008) found a positive impact of debt to growth. However, Geiger (1990), Gerald (1994) and Deshpaned (1997) found that debt retards growth. Using an augmented aggregate production function, Fosu (1996) establishes a nonlinear relationship between debt and growth in SSA, thus confirming the Debt Laffer curve hypothesis. Fosu (1999) again also established a negative effect of external debt on growth in SSA, a finding also confirmed by Iyoha (1999). Were (2001), and Hameed and Chaudhary (2008) conducted time series analysis on Kenya and Pakistan, respectively, and found external debt to be negatively correlated with growth. Reinhart and Rogoff (2010) employed panel regression analysis on a sample of 20 developed countries and found that for GDP to Debt ratios below 90 per cent, the relationship between debt and growth was insignificant whilst for ratios above 90 per cent external debt worsened the median growth by 1 per cent and considerably more for mean growth. This finding is consistent with Kumar and Woo (2010) who also found that external debt is deleterious to economic growth in developed countries. Musebu (2012) found that external debt does not promote economic growth in HIPC Southern Africa Development Community (SADC) counties. A few studies, including Chowdhury (1994), Afxentiou and Serletis (1996), Cohen (1993), Frimpong and Oteng-Abaye (2003), have found no clear relationship between external debt and growth. Clearly, empirical investigations have divergent findings regarding the relationship that exists between external debt and economic growth, even though the balance tilts in the negative direction. In the context of Sub-Saharan Africa, save studies by Fosu (1996; 1999) and Iyoha (1999), there is a dearth of research on the effect of external debt on economic growth. The present paper adds to the external debt-growth literature using data for 39 SSA countries from 1990 to 2013. Unlike previous studies on SSA, the paper controls for per capita income levels of countries in the sample and uses the system GMM estimation technique.

## 3. Methodology and Data

We adopt the augmented production function specified by Fosu (1996), which expresses economic growth as a function of labour, capital and exports. The importance of labour and capital in the growth function derives from neoclassical theory whilst the robustness of exports in the growth model is attributed to its generally avowed significant contribution to growth (Fosu, 1990). The augmented production function is specified as:

$$q_i = b_1 + b_2 l_i + b_3 k_i + b_4 x_i + e_i \tag{1}$$

where $q$ is growth rate of output; $l$ denotes labour force growth rate; $k$ represents growth rate of capital, $x$ is growth rate of exports; and $e$ is the error term.

We employ the dynamic panel regression model in estimating the effect of external debt on economic growth in SSA. The predetermined variables in the model comprises lagged dependent variable and lagged independent variables aimed at incorporating the persistence of those variables in the estimation. Furthermore, the use of a dynamic panel model would help account for temporal serial correlation, and minimize the likelihood of estimating a spurious regression model. The dynamic panel regression model is generally specified as:

$$q_{it} = \alpha q_{it-1} + \beta x_{it} + \gamma x_{it-1} + \mu_i + v_{it} \tag{2}$$

where $\mathbf{q}_{it}$ represents output growth, $\mathbf{q}_{it-1}$ represents the lagged output growth, $\mathbf{x}$ is the matrix of all independent variables, $\mathbf{x}_{it-1}$ is the matrix of lagged independent variables, $\boldsymbol{\mu}$ denotes unobserved country-specific time-invariant effect, $\mathbf{v}$ represents the stochastic error term, $\boldsymbol{\alpha}$, $\boldsymbol{\beta}$, $\boldsymbol{\gamma}$ are vectors of parameters to be estimated, **i** indexes the countries under study, and **t** denotes time (or year).

The debt overhang (DOH) and liquidity constraint (LCH) hypotheses emphasize investment as the main channel of the debt-growth nexus. The DOH posits that when a country accumulates huge debts, it beacons an eroding fiscal space, creating uncertainty in investors' minds thereby discouraging investment. A liquidity constraint, on the other hand, binds on a country when external debt service requirement reduces the financial resources available for investment into the economy. Otherwise, a fall in current debt service obligations should result in a rise in current investment for a given level of future loan (Cohen, 1993).

While many empirical studies have traced the effect of debt on growth through investment and savings (see Fry, 1989; Faini and DeMelo, 1990; Hoffman and Reisen, 1991; and Savvides, 1992), a few have attempted ascertaining the direct impact of debt on economic growth (Fosu, 1996, 1999; and Iyoha, 1999). This paper adopts the latter approach to investigate the effect of external debt on economic growth in Sub-Saharan Africa. As noted by Fosu (1996), the effect of external debt on growth need not necessarily be traced through investment. He argues that this indirect effect may be less important than the direct approach for Sub-Saharan African countries. Hence in analysing the debt-growth nexus, the traditional research emphasis on the effect of debt on investment is not completely advisable (Fosu, 1996). The direct effect is tested for SSA by directly incorporating the debt variable into the augmented production function, as specified in equation (3)

$$\begin{aligned} grgdp_{it} &= b_0 + b_1 grgdp_{it-j} + b_2 labor_{it} + \\ &b_3 kgdp_{it} + b_4 gxports_{it} + b_5 debt_{it-k} + \\ &b_6 sqdebt_{it} + b_7 midinc_{it} + b_8 debtinc_{it} + u_{it} \end{aligned} \tag{3}$$

where *grgdp* denotes real GDP growth, *labor* is natural log of labour force, *kgdp* is total investment as percent of GDP (proxy for capital), *gxports* is growth rate of exports, *debt* stands for external debt as percent of GDP (proxy for debt burden), *sqdebt* is the square of external debt as percent of GDP (captures nonlinearity in the debt-growth relationship), *midinc* is a dummy (assumes 1 for middle-income country and 0 for low-income country), *debtinc* is interaction of debt and income dummy, *b's* are coefficients to be estimated, *u* is the error term, *t* is time, and *i* represents country. The variable of interest is external debt to GDP ratio used as a measure of debt burden. Data on all the variables are obtained from The World Bank (World Development Indicators) and the International Monetary Fund (IMF) online database thus, World Bank (2015) and IMF (2015), respectively. We estimate equation (3) by the system Generalized Moments of Methods (GMM). The system GMM is a superior technique among all the dynamic model estimators since it has an inbuilt mechanism to resolve issues of endogeneity arising from omitted variables, endogeneity of explanatory variables, and the presence of measurement error, amongst others (Caselli et al., 1996; Roodman, 2006; and Hesse, 2008).

## 4. Results

Table 1 presents descriptive statistics of the variables employed. Real GDP growth rate for the 39 SSA countries in the study averaged 3.8 per cent for the period 1990-2013 with a standard deviation of 7.3. The standard deviation of real GDP growth portrays the extent of variability in the growth rates among the selected countries for the period under study. The level of external debt in the region remains high, averaging 83.9 per cent of GDP over the period. With a standard deviation of 134.5, this also reflects the high variability in the debt-GDP ratio among the sampled countries over the period of study. The Fisher Test for stationarity shows no presence of unit roots in panels (see Appendix). Hence, the variables are stationary and there is no tendency for any possible spurious regressions. Furthermore, the Hausman test results confirms that the fixed-effects is the preferred model, a pre-requisite for employing the system GMM technique (see Appendix).

Table 2 presents the dynamic panel estimates of the system GMM model. The random and fixed effects estimates are also reported to ascertain the consistency of the parameter estimates. The Wald Chi–squared statistic for the system GMM model indicates joint significance of the explanatory variables.

**Table 1.** Descriptive Statistics of Variables, 1990-2013

| Variable | Mean | Standard Deviation |
|---|---|---|
| Real GDP Growth Rate (%) | 3.77 | 7.26 |
| Investment as % of GDP | 20.40 | 9.54 |
| Labour Force (millions) | 6.31 | 8.76 |
| Export Growth Rate (%) | 7.74 | 22.47 |
| External Debt as a % of GDP | 83.90 | 134.53 |

**Table 2** Results of the Estimated Dynamic Model

| | System GMM | | | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Random Effects | Fixed Effects |
| First lag of GDP growth | 0.0653** | 0.0665** | 0.0681** | 0.0202 |
| | (0.0330) | (0.0337) | (0.0345) | (0.0354) |
| Second lag of GDP growth | 0.0958* | 0.0973* | 0.0981* | 0.0622*** |
| | (0.0324) | (0.0325) | (0.0332) | (0.0341) |
| Debt to GDP ratio | -0.0148* | -0.0464* | -0.0468* | -0.0548* |
| | (0.0034) | (0.0146) | (0.0149) | (0.0165) |
| First lag of Debt to GDP ratio | | 0.0395* | 0.0396* | 0.0380* |
| | | (0.0121) | (0.0124) | (0.0123) |
| Second lag of Debt to GDP ratio | | -0.0032 | -0.0036 | -0.0037 |
| | | (0.0091) | (0.0093) | (0.0096) |
| Square of Debt to GDP ratio | | -0.00001 | -0.00002 | 7.68e-06 |
| | | (0.00004) | (0.00005) | (0.00005) |
| Middle income country | -0.0664 | -0.0276 | 0.0098 | *Dropped due to* |
| | (0.3617) | (0.5601) | (0.5686) | *multicollinearity* |
| Debt*Middle income country | | 0.0008 | 0.0016 | -0.0010 |
| | | (0.0067) | (0.0068) | (0.0085) |
| Growth rate of exports | 0.0677* | 0.0660* | 0.0678* | 0.0659* |
| | (0.0076) | (0.0076) | (0.0078) | (0.0079) |
| Log of Labour force | 0.3876* | 0.3880* | 0.3785* | -0.9637 |
| | (0.1376) | (0.0076) | (0.1433) | (0.8751) |
| Investment to GDP ration | 0.0513* | 0.0579* | 0.0487** | 0.0621** |
| | (0.0194) | (0.0195) | (0.0196) | (0.0256) |
| Constant | -2.8928 | -3.3399 | -3.0219 | 17.7413 |
| | (2.1401) | (2.2264) | (2.3701) | (13.3202) |

| | | | | |
|---|---|---|---|---|
| Wald chi2(11) | | | 188.80 | |
| F (10, 706) | | | | 13.72 |
| Prob>F | | | 0.0000 | 0.0000 |
| Wald chi-squared (prob>chi2) | 0.0000 | 0.0000 | | |
| Arellano-Bond AR2 (prob>chi2) | 0.5660 | 0.6440 | | |
| Sargan Test (Prob>chi2) | 0.8060 | 0.4350 | | |
| Number of observations | 757 | 754 | 754 | 754 |

Note: Standard errors are in parentheses; *, ** and *** denote statistical significance at 1%, 5% and 10% respectively.

The Arellano–Bond test AR (2) in first differences fails to reject the null hypothesis of no two–period serial correlation in the residuals. Besides, the Sargan test for over-identifying restrictions shows that the over-identifying restrictions are valid in the model implying that the model does not suffer the weakness of too many instruments. The system GMM results (model 2) reveals that external debt negatively affects growth in SSA. A one percentage point increase in external debt to GDP ratio reduces GDP growth by 0.05 percentage points. This result is consistent with the random and fixed effects model results. According to Fosu (1999), the negative contemporaneous effect of external debt on growth suggests a reverse causality between external debt and growth. Thus, low growth performance elicits the need for more debt acquisition in the current period. The result is in agreement with the findings of Fosu (1996, 1999), and Iyoha (1999).

The results also indicate that the coefficient of first lag of debt is positive and significant at 1 per cent whilst the second lag is insignificant. Thus, the first lag of debt to GDP ratio stimulates GDP growth by 0.04 percentage points. We extrapolate that greater debt acquisition in the previous period makes resources available for higher growth in the next period. However, the magnitude of the positive effect is lower than the negative contemporaneous effect of debt. The Square of external debt as a percentage of GDP is statistically insignificant, suggesting the non-existence of a nonlinear relationship between external debt and GDP growth, contrary to the findings of Fosu (1996), who found that external debt and growth are positively correlated at low levels of investment but the relationship turns negative after the investment to GDI/GDP ratio reaches a threshold of 16 per cent. The coefficient of the interaction of debt and middle-income is positive but statistically insignificant, indicating that being a middle-income country does not make external debt less detrimental to growth than in low-income countries.

In order to ascertain the independent effect of external debt on growth, a restricted form of the dynamic model in equation (3) is estimated. The restricted model excludes the lags of debt to GDP ratio, debt to GDP ratio squared, and debt-middle-income dummy from the dynamic model. The results are reported as model 1 in Table 2. The restricted model estimates are similar to those of the complete model (model 2) in spite of a reduction in the coefficient of the debt variable. The results indicate that an increase in external debt to GDP ratio by 1 percentage point impedes economic growth by 0.02 percentage points at 1 percent level of significance. Thus, the coefficient of debt remains negative and significant, implying that the adverse effect of external debt on growth is independent of the inclusion of first and second lags of external debt to GDP ratio, external debt to GDP ratio squared, and debt-dummy interacted variable in the model, thereby providing further support for the robustness of the debt coefficient. The results from both Model 1 and Model 2 shows that capital, labour, and exports are positively significant at 1 percent, lending further empirical evidence as key determinants of growth.

## 5. Conclusion

This paper sought to examine the effect of external debt on economic growth in SSA for the period 1990-2013. Results indicate that external debt directly impedes economic growth in SSA. Classification of the countries in the sample into low-income and middle-income economies had no significant effect on the debt-growth relationship. In other words, being a middle-income country does not enhance the effect of debt on growth compared to low-income countries in the sample. The paper did not confirm a non-linear relationship between external debt and growth. Does the finding of a negative relationship between external debt and growth imply that SSA countries should cut back on foreign borrowing in other to boost growth? This would be a difficult policy decision for most governments in the region. Given the huge savings gap in most of the SSA countries, these economies would continue to rely on foreign financing of development programmes in the short- to medium-term. Rather what governments in SSA must do is to ensure that the foreign loans are invested in projects that would eventually generate enough returns to amortize the debt. Enhancing domestic revenue mobilization will also go a long way to reduce the over reliance on external financing. In this regard, there is the need to embark on efficient revenue mobilization drives through the broadening of tax bases, devising various strategies to capture untaxed informal sectors into the tax net and check revenue leakages so as to increase domestic revenue mobilization.

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## Appendix

**Table A1.** List of the 39 Sub–Saharan Africa countries in the study

| **Low-Income Countries** | **Lower-Middle Income Countries** |
|---|---|
| Benin | Cameroon |
| Burkina Faso | Congo Republic |
| Burundi | Côte d'Ivoire |
| Central Africa Rep | Ghana |
| Chad | Kenya |
| Comoros | Lesotho |
| DR Congo | Mauritania |
| Eritrea | Nigeria |
| Gambia, The | Senegal |
| Guinea | Sudan |
| Liberia | Swaziland |
| Lesotho | Zambia |
| Madagascar | |
| Malawi | **Upper-Middle Income Countries** |
| Mali | Angola |
| Mozambique | Botswana |
| Niger | Gabon |
| Rwanda | Mauritius |
| Sierra Leone | South Africa |
| Tanzania | |
| Uganda | |
| Zimbabwe | |

Note: Country groupings based on United Nation's classification of countries.

**Table A2:** Results of Fisher Unit Root Test of Stationarity

| Variables | Inverse chi-squared | Inverse normal | Inverse logit | Modified inverse chi-squared |
|---|---|---|---|---|

| | Statistic | Prob | Statistic | Prob | Statistic | Prob | Statistic | Prob |
|---|---|---|---|---|---|---|---|---|
| GDP growth rate | 210.5609 | 0.0000 | -7.1303 | 0.0000 | -7.8768 | 0.0000 | 10.6134 | 0.0000 |
| Ln of labour force | 555.8800 | 0.0000 | 11.1950 | 0.0000 | -21.7506 | 0.0000 | 38.2610 | 0.0000 |
| Investment % of GDP | 139.8574 | 0.0002 | -4.6836 | 0.0000 | -4.7345 | 0.0000 | 5.1795 | 0.0000 |
| Export growth | 225.3758 | 0.0000 | -8.4528 | 0.0000 | -9.1508 | 0.0000 | 11.7995 | 0.0000 |
| Debt as a % of GDP | 197.8712 | 0.0000 | -5.6376 | 0.0000 | -6.5721 | 0.0000 | 9.5974 | 0.0000 |
| Debt as a % of GDP2 | 641.9709 | 0.0000 | -20.8838 | 0.0000 | -28.3261 | 0.0000 | 45,1538 | 0.0000 |
| (Debt*middle income) | 196.6536 | 0.0000 | -6.6885 | 0.0000 | -7.3703 | 0.0000 | 9.4999 | 0.0000 |

Source: Authors' computation using STATA 13

**Table A3:** Hausman Test for Fixed Effects and Random Effects

Ho: Difference in coefficients not systematic (Random effect)

Chi2 (4) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B) = 35.63

Prob>chi2 = 0.0000

Source: Authors' computation using STATA 13

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# Innovation and Creativity at the Bottom of the Pyramid

Lauri Erik Lehikoinen[1*], Amanda Lundh[1], Louis Meert[2], Kevan Waeingnier[2], Nina Bentsen[3], Ida B. T. Norbye[3]

[1] Mälardalen University, P.O. Box 883 721 23 Västerås, Sweden
[2] ECAM Brussels Engineering School Promenade de l'Alma, 50 1200 Bruxelles, Belgium
[3] University College of South-East Norway Gullbringvegen 36 3800 Bø, Norway

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ABSTRACT

**Purpose**
The purpose of this study is to illustrate how innovative and creative companies develop products and services at the bottom of the economic pyramid (B.o.P) markets. This paper attempts to gain further insight regarding the usage of the 4A perspective developed by Anderson and Billou (2007) and the Triple Bottom Line (TBL) framework developed by Elkington (1999) as guidelines to achieve success in BoP markets.

**Design/methodology/approach:**
The authors of this paper come from three different countries (Sweden, Norway and Belgium), which gave a possibility to gather qualitative data from companies located or founded in these three countries. The 4A's perspective and the TBL framework is used as a theoretical foundation to further investigate the phenomenon regarding how western companies act on B.o.P markets. Thus, this paper attempts to answer the following research questions: How can (social) entrepreneurs (or any companies) adapt the 4A perspective to introduce disruptive innovations and still, with the help from the TBL framework, maintain their sustainable, responsible and ethical approach? Additionally, how can the mind-set of innovation and creativity at the bottom of the pyramid in developing markets be transferred to social entrepreneurs in developed markets? Primary data was gathered through interviews with Solvatten (Sweden), MicroStart (Belgium) and Easypaisa (Norway).

**Findings:**
The 4A perspective was proven to be an effective tool while approaching B.o.P markets. Companies must think outside the box of traditional marketing and be creative, to achieve their goals. In dynamic markets, a company will struggle to keep up with all constraints. The case companies struggled most with acting sustainably while achieving profitability.

**Research limitations/implications**:
To further validate the results, the sample size should be bigger including several different companies and informants.

**Originality/value**:
This paper contributes to the literature of the already-established 4A perspective and the TBL framework by providing in-depth research, by investigating companies and their operations from three different countries (Sweden, Norway and Belgium). To our knowledge no prior case studies have been conducted in these countries.

**Keywords:**
Bottom of the Pyramid (B.o.P), 4A perspective, Triple Bottom Line (TBL), disruptive innovations, creativity, Solvatten, MicroStart, Easypaisa



## 1. Introduction

The Bottom of the Pyramid (the B.o.P) is a segment consisting of more than four billion people, who are living on less than two dollars per day. The segment cannot be described deeper since the participants come from different countries, cultures and therefore have

†Corresponding Author: Lauri Erik Lehikoinen
E : laurierik.lehikoinen@hotmail.com
*DOI:* 10.25103/ijbesar.111.02

unique needs, behaviours, attitudes, priorities as well as preferences. Each country's city. This creates barriers, which can lead to heterogeneity within the segment. However, the segment accounts for five trillion dollars in purchasing power, which implies that there is a market in serving the world's poorest. The market, which itself consists of multiple markets, is unorganized and fragmented, which is one of the many challenges companies face when they try to penetrate those markets. B.o.P markets are often being ignored by bigger firms, due to their complex nature, which is why companies need to know more about the dynamics of those unserved markets. Countries that belong to the B.o.P market are underdeveloped and characterized by poverty; some countries in Asia such as India and Vietnam, many countries in Africa and some countries in Latin America. When companies sell to this market, the ethical dilemma seems to be unavoidable, since achieving profits out of customers who have little or hardly any money just does not seem right (Prahalad, 2012). Prahalad and Hart (2002) state that B.o.P markets present enormous business opportunities, especially for multinational companies as there is a possibility of converting B.o.P markets into profits due to the billions of potential customers joining commercial markets for the first time. Due to the large size of these untapped markets, B.o.P markets collectively counts as a multi-trillion-dollar industry. (Karnani, 2006) In general, companies that focus solely on their main market employ sustaining innovations in contrast to disruptive innovations. Disruptive innovations can be in forms of both technology and business models (Kandachar, 2009).

Disruptive innovations describe a product or service which take root in simple applications in the bottom of a market and moves relentlessly up the market, before it displaces its established competitors and in some cases, creates a new market. Most organizations end up providing products or services that are too expensive and sophisticated for many customers in their existing market, like B.o.P markets. By charging high prices to their most demanding customers at the top of the market, they also open the door to disruptive innovations at the bottom of the market. This may allow consumers from B.o.P markets to access a product or service that originally was aimed to consumers with higher purchasing power. The B.o.P can present a potential new market for companies to successfully employ disruptive innovations. The main drivers for the up-rise of the B.o.P and the need for disruptive innovations have been listed by Prahalad and Hart (2002): people in the B.o.P have increased information access, multi-national companies (MNCs) can be supported by non-governmental organisations (NGOs) due to gradual withdrawal of international aid, competition at the top of the pyramid is intense, and, by serving B.o.P markets MNCs can prevent people from migrating to urban areas - which would make the potential customers even more difficult to find.

Because of the opportunities created by the drivers of the B.o.P it would be beneficial for companies to know how they can penetrate B.o.P markets and conquer the ethical dilemma of charging consumers that have little or hardly no money at all. Companies therefore need to know how to make their product or service available, affordable, acceptable and how to create awareness about the offering. Penetrating B.o.P markets by caring for the environment, the people, and at the same time make profits, requires creativity from the company. People, planet and profits - also called the Triple Bottom Line (TBL). The TBL framework is developed by John Elkington (1994) and the framework considers the financial health of an organization, as well as the social and the environmental impact. The creativity that innovators in B.o.P markets use could also be transferred to developed markets, but companies do not have enough knowledge on how to do so, since previous research in this field has not had the viewpoint used in this paper. The 4A's perspective is a marketing tool used in this paper to comprehend how companies design their offerings to answer the needs and wants of a specific market. When using the 4A's perspective, the focus is on the consumer rather than on the product itself. That is what makes it a particularly relevant tool for analysing B.o.P. markets, where consumers differ greatly from one market to another. (Anderson and Billou, 2007)

The purpose of this paper is to describe how companies can make their offering available, affordable, acceptable and how companies can make potential customers aware of the offering. This was undertaken by investigating three companies which have penetrated B.o.P markets and have managed to establish business there. Furthermore, this paper aims to give managerial implications for companies in need of more information about how B.o.P markets can be penetrated and how this method could be transferred to developed markets. The aim is to answer the following research questions (RQs):

*RQ1: How can (social) entrepreneurs (or any companies) adapt the 4A perspective to introduce disruptive innovations and still maintain their sustainable, responsible and ethical approach?*
*RQ2: How can the mind-set of innovation and creativity at the bottom of the pyramid in developing markets be transferred to social entrepreneurs in developed markets?*

## 2. Theoretical framework

To introduce new products and services, and successfully maintain their position in B.o.P markets, companies must consider vast differences that occur between B.o.P and developed countries. With an emphasis on the 4A's perspective and the Triple Bottom Line (TBL) framework, the authors present ways in which companies can achieve sustainable and profitable success. As an addition, a definition of disruptive innovations, creativity and social entrepreneurship is given to achieve clarity among the several different definitions.

### 2.1 Disruptive Innovation and Creativity

The dilemma regarding the actual definition of disruptive innovation has raised a lot of discussion and misunderstandings (Markides, 2006). According to Thomond and Lettice (2002) a disruptive innovation is something that is revolutionary in its nature and therefore, the product or service eventually shakes the conventional market. It allows a whole new segment of consumers to access a category of products or services, which were exclusively accessible to wealthy or skilled individuals prior to the disruptive innovation. As Danneels (2004) states, the whole topic requires comprehensive exploration and needs to be investigated further. Furthermore, Markides (2006) emphasizes that very unclear understanding regarding the concept is prevailing. To clarify the prior definition, Schmidt and Druehl (2008) argue that a disruptive innovation is an innovation that is introduced from the bottom and up, causing anomalies in the market. To further investigate the phenomenon, the concept of creativity will be defined; creativity, according to Maley (2003) is a collection of ideas rather than just a word with a synonym. It is described as creating something new, using old things or ideas in new ways, finding connections that are new or bringing exciting surprises to someone (Maley, 2003). It is therefore not sufficient to "think outside the box", the result of the thought process must create value for someone. The literature on creativity has throughout the years offered several ways to look at the concept. Barron (1955) tried to define creativity as something that must be original and effective. One of the latest attempts to give an updated definition of creativity was made by Corazza (2016), who emphasizes that creativity does not have to be original and effective, rather it is "possible" that creativity is original. As comprehensive research has been made regarding the attempts to define what creativity is, authors like Simonton (2016), has argued that to understand what creative ideas are, people should understand what creativity is not. Thus, creativity means to do something in a way it is not normally done, since doing something the normal way will not work out. Creativity could be concluded as a mind-set referring to thinking outside the box of normalities and finding new ways of doing things, while providing value, i.e. being creative.

## 2.2 Social Entrepreneurship

Recently increasing international attention has been given to social entrepreneurship, in literature (Chell, Nicolopoulou & Karatas-Özkan, 2010). Dees (1998) emphasised the confusion that comes from the concept of social entrepreneurship. People started using the concept to describe how not-for-profit (NFP) firms started business ventures with an aim to make profits. Zahra, Gedajlovic, Neubaum and Shulman (2009, p.1) defined social entrepreneurship as:

> *"Social entrepreneurship encompasses the activities and processes undertaken to discover, define, and exploit opportunities to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner".*

To give a further understanding regarding social entrepreneurship, Shaw (2004) described it as the work done by people and organizations that are thriving towards better societies - not only for financial reasons. Christie and Honig (2006) stated that due to the rapidly emerging field of social entrepreneurship, several major concerns regarding the conceptualization and its definition have occurred. This is due to the broad usage of the concept "social entrepreneurship" in various settings including entrepreneurial firms, NFP organizations and the general public. Even though the usage of the concept is relatively new, social entrepreneurs have existed for a long time. As Dees (1998 p.1) stated:

> *"The language of social entrepreneurship may be new, but the phenomenon is not. We have always had social entrepreneurs, even if we did not call them that. They originally built many of the institutions we now take for granted".*

Weerawardena and Sullivan Mort (2006) brought up the fact that most literature considering social entrepreneurship occurs within nongovernment NFPs. Therefore, the authors of this paper, emphasised the importance of understanding the role of for-profit organizations as social entrepreneurs. As Wallace (1999) suggested, all social enterprises exercising for-profit activities to support NFP activities can be viewed as social entrepreneurs. Thompson (2002) expanded this to firms aiming for profits with some commitment to do good, set up for a social purpose and operating as a business.

## 2.3 The Triple Bottom Line

To gauge the sustainability of a company, the Triple Bottom Line (TBL) accounting framework will be used. The TBL was developed by John Elkington (1994) and accounts for both the financial health of an organization, and the social and environmental impact; referred to as the 3P's: profits, people and planet. A nominal figure cannot be put on all economic, environmental and social variables that may be affected by an organization or a project. Therefore, the measurements used in the TBL do not share a common unit. The choice of indicators used in each of the 3P's will vary from one organization or project to another. This further depends on the nature (business, non-profit, government, etc.), the domain of activity and the geographical location. Economic (**profit**) measurements should include variables relating to the financial balance of an organization or project: income, expenditures, and factors that may influence those (e.g. taxes and employment). Environmental (**planet**) measurements should include variables that reflect the impact that an organisation or project has on natural resources. These can include the impact on air and water quality, energy and land use and emissions. Social measurements (**people**) should include variables that reflect impact on communities or villages; in terms of what the company does for the people living there. (Slaper and Hall, 2011)

## 2.4 The 4 A's

The 4A's perspective is an approach born as a complement to the traditional marketing mix (the 4P's). The former is more consumer-oriented, with a focus on providing the customers with the four essential values they seek: availability, affordability, acceptability and awareness; the latter is more product-oriented. A company must adapt the four criteria to their target market to be attractive to consumers. The criteria are especially useful to design an offering to B.o.P markets, in which customers' needs, budget, location and access to marketing channels differ drastically from those of a person in a developed country. Local specificities often make it impossible for a product designed for a developed market to simply be sold as it is to B.o.P consumers. Furthermore, the product and marketing strategies associated with it must be redesigned to fulfil the 4A's for each developing market. Creativity is key to tailor the offer to the specific needs of consumers in a specific market, which is further assessed through the 4A'S perspective. Since many consumers in B.o.P markets do not have access to products and services that are being taken for granted in developed countries, there is room for disruptive innovations where the 4A's can be properly and creatively applied. (Anderson and Billou, 2007) The 4A's will hereunder be defined and each A will be described with a focus on how they can be applied to ensure successful penetration to B.o.P markets.

**2.4.1 Availability**

According to Sheth (2012), availability can be defined as the extent that customers can acquire and use a product. Failure to meet this criterion will lead to a rejection of the product, due to its scarcity or complete absence in the target market, or because of practical difficulties when customers buy. In developing markets, finding or setting up proper distribution channels is a major hurdle to overcome to bring the product to the buyer, mostly since the state of the infrastructure is inadequate. A significant part of B.o.P markets are in rural areas - which makes it crucial to develop a proper supply chain to gain access those in remote locations. Commercial harbours and airports, an efficient railroad network and well-maintained roads are crucial means to distribute goods, but traditional distribution channels cannot be relied upon when attempting to reach geographically isolated segment of consumers. The company must establish an efficient distribution strategy in order to deliver their offering while minimizing the impact on the price. (Anderson and Billou, 2007)

**2.4.2 Affordability**

Affordability can be defined as the consumer's ability and willingness to pay the price for the product (Sheth, 2012). Failure to provide affordability will lead to rejection of the product since it is too expensive to fit consumer's monthly budgets, or deemed as such by consumers. A typical B.o.P consumer lives on less than 2$ per day and hardly has savings to spend; the consumer spends most of the income on food and survival. It is therefore crucial to offer products at a very low price to reach the largest possible portion of the market. A redesign of the product will often be necessary (e.g. selling smaller and more affordable packages), as the price needs to be decreased drastically compared to similar offers in a developed market. Profitability will be achieved by high turnover - by reaching many people. (Anderson and Billou, 2007)

**2.4.3 Acceptability**

Sheth (2012) defines acceptability as the extent to which a product reaches the consumer's expectations. Failure to achieve product acceptability will lead to rejection as it does not fit local tastes or cultural specificities, or does not fit with existing business practices. Practical and cultural considerations impact the way a product is used or consumed and greatly varies from one developing market to another. As an addition, business models to which consumers are accustomed to are very different from one region to another. Thus, a successful offering in developed markets might not be as successful in the B.o.P and vice versa. It is therefore, crucial for a company that wants to enter such markets to conduct in depth research on their potential customers to understand their habits, with regards to the product category. Companies may have to tailor the offerings and adapt the products to each market, or they may need to educate customers on how to use the product so that it can be understood and accepted as intended by the company. (Anderson and Billou, 2007)

**2.4.4 Awareness**

Awareness is defined as the extent to which a customer gains knowledge about a product's existence and characteristics, and is incited to try it as well as reminded to purchase it (again) (Sheth, 2 012). Failure to promote awareness will lead to rejection of the product due to lack of visibility. Access to modern media is not guaranteed in all parts of the developing world, since televisions and computers with an access to internet can be a rare sight. It will therefore prove unsuccessful to advertise products through these channels. For example, setting up advertising signs in gathering points such as stores and on the side of roads, and hiring brand ambassadors that will advertise the product by word of mouth will prove far more efficient as they will reach a far greater public. Advertising must fit local specificities to ensure proper visibility of the product. The local language, culture, religion, laws and regulations should be considered to create awareness. (Anderson and Billou, 2007)

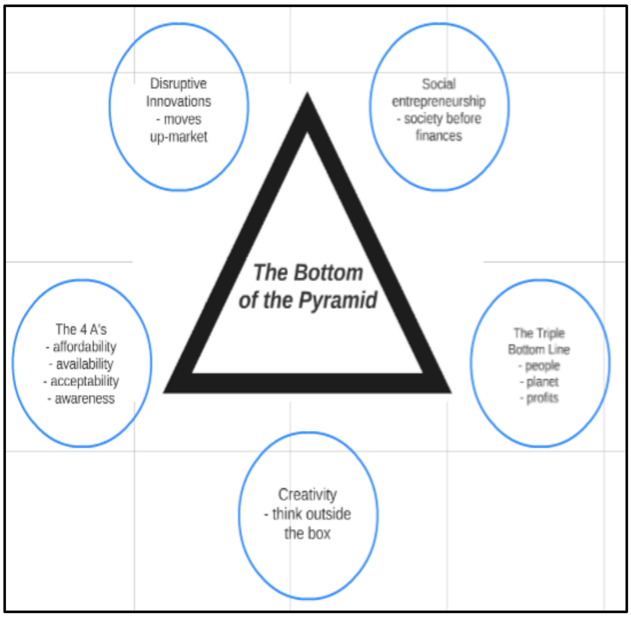


**Figure 1.** Theoretical Summary

**2.5 Theoretical Summary Discussion**

Companies face several challenges when attempting to penetrate B.o.P markets. These challenges include the difficulties to get the products to the people living in rural areas, how to ensure that people in countries with a very low GDP per capita can afford to buy the products; how companies can overcome the possible liability of foreignness and how will the companies make their products visible so that people get information about them. As an addition to achieving profits a company can ensure its sustainability by having a positive impact for the people in B.o.P countries, and by focusing to keep the planet safe (e.g. reducing emissions). Based on the previous literature the authors developed the B.o.P penetration model (picture. 1), which illustrates the framework, perspective and concepts used in this study. The B.o.P penetration model will further help the authors answer the research question and it harmonizes the 4A and TBL framework, disruptive innovations, social entrepreneurship and creativity.

## 3. Methodology

This research followed qualitative design, which according to Bryman and Bell (2013, p.411) is a design that aims to describe contexts and give a deeper understanding of a subject. Qualitative studies have some negative aspects; there is a risk for subjectivity, low scores on replicability and generalizability, there is also a risk for low transparency in the methodology (Bryman and Bell, 2013, p.417). The first three are results of comparisons made between quantitative and qualitative studies, which means that since the two types of researches are designed differently due to different goals, they also have different advantages and disadvantages. By acknowledging the negative aspects however, the writers of this paper minimized the negative effects; by not involving their own thoughts to maintain objectivity and by keeping the methodology transparent so that the reader could understand how the research was planned and executed; both transparency and replicability were therefore heightened in this paper. To generalize the results, the writers recommend that the findings should be confirmed in future studies using quantitative study design. The main advantage with qualitative studies is that researchers get more in-depth information which can be analyzed and used to provide both researchers and practitioners in the field with a deeper understanding; which is the main argument for the research design chosen in this study since that relates to the paper's purpose.

### 3.1 Data Collection

The data was collected through interviews with leaders from the three chosen companies. The interview questions were developed to function as guidelines since they had to be adapted to each company, due to differences between the companies' innovations. The interviews were semi-structured, which according to Bryman and Bell (2013, p.474) is a recommended type of interview when flexibility is required for the subject and for answering the research questions. Since this paper researched three different companies with no purpose of comparing them, flexibility enhanced the data collection since it gave different perspectives while still following the same theme by espousing the interview guideline. It was key to collect similar data from the three different companies since the data was to be analysed in the same way; it therefore had to be representable and comparable in the sense that it would help the writers answer the research questions. Lastly, company websites were used as information sources that helped establish a foundational understanding of the companies before the interviews were conducted. The data collection also included searching for news articles in which the companies were mentioned.

#### 3.1.1 Selection of Informants

Three companies were examined, one from Sweden, one from Norway and one from Belgium. The Belgian company was chosen to give perspectives from as many countries as possible and for answering the RQ2. The Belgian company's business idea had been inspired from the B.o.P market, which is why it was interesting to see how that had been launched in Belgium. The Swedish and the Norwegian companies were chosen with focus on RQ1 and they were selected using five criteria that they had to fulfil:

- All companies had to be selling to end-consumers (B2C);
- All companies had to be selling an innovation that could be argued as being disruptive;
- One company had to originate from Sweden and one company had to originate from Norway;
- All companies had to be making profit or have the vision to be profit-making - NGOs were excluded;
- The innovation of each company had to be launched in the B.o.P.

These criteria were chosen for answering RQ1 and to make sure that the data sampling from the two different countries would be somewhat similar from the beginning. Both companies had to be selling to end-consumers due to the differences in business models between B2C and B2B - if these would have been mixed, the collected data would not have been able to answer the same questions. The criteria were also made because the B.o.P was the chosen market and companies selling B2B are not conducting business directly in the B.o.P. Since disruptive innovations was one of the main topics of this paper the companies had to be selling products or services that could be defined accordingly. The last criterion was adopted to widen the research question to RQ2. Furthermore, using three different companies which originated from three different countries was based on two things. The authors come from three different countries and could therefore get easier and better access to companies based in their home-countries. Secondly, even though no comparison between the countries was made in this research, the use of three different countries in the data sampling gave a broader perspective and kept the focus away from the countries, since this paper did not have the purpose of investigating a country in particular. Due to RQ2, all companies had to be profit-making - if they would not have been, the complexity regarding ethics had not been discussable to the desired extent. Lastly, the definition of a disruptive innovation is that it starts in the B.o.P and climbs its way up the ladder and therefore the last criteria was connected to follow that definition.

### 3.1.2 Interviews

Prior to the interviews, the interview guideline was sent to the informants. This was made to ensure that the respondents would be prepared for the topic of discussion and to make sure that the informant was going to be able to answer the questions, as well as for making the respondent feel prepared for the interview.

A semi-structured interview with **Petra Wadström**, the founder and CEO of Solvatten AB was held in Stockholm Sweden where the head office of Solvatten is located. During phone calls prior to the interview, the informant was briefed about the purpose of this study to provide sufficient knowledge regarding the topic. The interview, which lasted for 42 minutes, was held in a conference room that ensured the communication to flow freely without any distractions. The informant gave her consent to record the interview and therefore, the interviewers mobile phone was recording the whole interview. To further investigate the phenomenon, the interview with Petra was desirable due to her ability to provide comprehensive knowledge and understanding about the company. Her long history with the development of the product, several modifications with it so it can solve real problems and her long history in the field (e.g. research in Nepal and constant trips to B.o.P countries) have given her the experience that not many have. These, among many other reasons, is why Petra is considered as a reliable and legitimate source to share information that can be used to answer the research questions. Petra's true passion and enthusiasm regarding the topic and her company made the interview exciting. Her willingness to contribute to the research and detailed examples clarified the daily operations that a social entrepreneur is handling.

A semi-structured interview with **Roar Bjærum**, Telenor's Group Head of Financial Services in Asia and the man behind Easypaisa, was held through Skype as he is currently based in Bangkok, Thailand. The interview lasted for 56 minutes and the informant was happy to share his long history with the development of Easypaisa and his experience with operating in the B.o.P market in Pakistan. The informant was willing to provide interesting insights about Easypaisa and did his best to present the information in a relevant way, constantly referring to the B.o.P and disruptive innovations.

A semi-structured interview with **Adrien Lippolis**, a team leader at MicroStart in Brussels, Belgium was conducted. The interview took place in MicroStart's conference room. Initial contact was made by email with Adrien. The purpose of the interview was discussed and explained in advance. Adrien received the questions at the beginning of the interview on printed sheets. He gave his consent to be recorded, which was done using the interviewer's phone. The entire meeting took 45 minutes and was not interrupted. The informant has worked at MicroStart for 3 consecutives years and has changed positions within the company. He could provide great insight of the company that he was working for and also, he had a great level of knowledge regarding the history of microfinance. He gave the writers accurate information about how the company was working and what are the challenges it might have to overcome in the following years.

### 3.2 Development of interview questions

To answer the research questions, the authors carefully formed a set of questions (see appendix 1) that guided the interviewees to give relevant examples. According to Jacob and Furgerson (2012), the interviewer should have comprehensive understanding of the relevant literature. Therefore, after thorough review of previous literature, the authors could differentiate the questions of this study from prior similar studies. This helped to form meaningful (and not too broad) questions. As Jacob and Furgerson (2012) stated, by narrowing the interview questions, the researchers can obtain meaningful data.

The aim of the first four questions was to get familiar with the companies and to relax the informants by asking something they were familiar with, to set the mood for the interview. Questions 5, 6 and 20 were formed to get a better insight to the overall challenges and views of the companies. Regarding question 7-10, the focus was to find thorough examples and explanations that are following the 4A framework. Questions 11, 12 and 13 were kept brief, and asked to get a better understanding regarding what disruptive innovations, creativity and social entrepreneurship mean to the informants. Questions 14- 16 were formed to investigate suggestions of transferring the mind-set of entrepreneurs at B.o.P markets to entrepreneurs in the developed countries. The remaining questions (17-19) were formed to understand to what extent and how the companies consider people, planet and profits.

All the above-mentioned questions guided the interviews to a comprehensive and thorough discussion. Since qualitative research is to a large extent about materializing sudden and unexpected explanations from the informants (Jacob & Furgerson 2012), the questions were purposively stated expansively. This gave the informants room to think and create in depth answers without feeling restricted. Thus, this way of structuring the questions gave the interviewers and informants a feeling that they were in a conversation instead of in an interview. Table 1 (see below) shows how the questions refer to the theories and how the answer to each question bring meaning to this paper, regardless of what the answer will be.

### 3.3 Data Analysis

After the interviews were completed, full transcripts were written down (appendices 2, 3 and 4). Sweden's interview with Solvatten was held in English and therefore no translation was made in appendix 2. Norway's interview with Telenor Easypaisa was held in Norwegian and was therefore translated afterwards into English (appendix 3). Belgium's interview with MicroStart was held in French, upon the respondent's request, therefore appendix 4 was also translated into English afterwards. The transcripts were summarized and the writers searched for typicalities in each summary, which were then discussed separately, topic by topic and country per country in the discussion. Main findings were highlighted and stressed by using quotes from the three interviews.

## 4. Company descriptions

To further gather valid data, three companies were chosen due to their suitability to the previously-mentioned criteria. The three case companies are listed below and briefly introduced with an aim to give a better understanding of their nature.

**4.1 Case Company Sweden: Solvatten AB**

Solvatten AB is a Swedish social enterprise that offers portable water purification containers with an aim to give everyone around the globe an easy access to clean and safe water that can be used for drinking and bathing (Swedish Cleantech, 2017). The innovation: the Solar Safe Water System is also called Solvatten. It brings affordable water to customers, charities and distributors located in B.o.P markets. Solvatten is used in more than 20 countries around the world and therefore the innovation enhances the wellbeing of people in the B.o.P. By using natural UV radiation to render contaminated water, within two to six hours (depending on the weather) the contaminated water becomes drinkable. This contributes to the fight against poverty, since now millions of women and children do not need to walk several miles every single day to get water that mostly is not clean enough. Due to this, women and children can contribute to other more productive actions (e.g. farming and education) (Solvatten, 2017). Other ways in which Solvatten protects the environment and enhances the whole world, is reduced carbon dioxide emissions and deforestation that comes about when the number of users of Solvatten increases. As Solvatten (2017) states *"Up to 70% of the energy used by a typical home in Sub-Saharan Africa is used for these purposes. This strong dependence on natural resources lead to smoke inhalation, burn injuries, carbon dioxide emissions, and deforestation, which give rise to environmental problems. Indoor plumbing and secure electricity supplies are distant dreams for far too many people"*. Solvatten is a valid case company to investigate since it fulfils the requirements of offering direct sales to consumers (one out of five main customer segments) and it is a limited company with an aim to do good without losing its profitability (Climate Solver, 2017).

**Table 1.** Operationalization

| Q | Reason: | Thoughts: | Framework: | Theory: | Writer and year: |
|---|---|---|---|---|---|
| **1 -4** | Company information | The writers aim to get to know the companies | | | |
| **5 -6** | General | The writers want to see if the company struggled more or less with one or more of the 4 A's (RQ1) | The 4 A's | By using the 4 A perspective the offering can be adapted | Anderson and Bilou (2007)& Sheth (2012) |
| **7** | Acceptability | The writers want to know how the company made the consumers accept the offering (RQ1) | The 4 A's | Companies need to know the target group and their expectations | Anderson and Bilou (2007) & Sheth (2012) |
| **8** | Awareness | The writers want to know how the company made the target group aware of the offering (RQ1) | The 4 A's | Non-classic market communication to spread information and create interest | Anderson and Bilou (2007) & Sheth (2012) |
| **9** | Availability | The writers want to know how the company made its product available in B.o.P markets (RQ1) | The 4 A's | The supply chain and the distribution channels need to be considered | Anderson and Bilou (2007) & Sheth (2012) |
| **10** | Affordability | The writers want to know how the company managed to make the offering affordable for the target group (RQ1) | The 4 A's | To make the offering affordable companies need to have the volume perspective on sales | Anderson and Bilou (2007) & Sheth (2012) |
| **11** | Disruptive innovations | The writers want to know if and how the company's innovation could be disruptive (RQ1) | Disruptive innovations | Starts in the B.o.P and moves up-market | Schmidt and Druehl (2008) |
| **12** | Social entrepreneurship | The writers want to know the company's view on social entrepreneurship (RQ2) | Social entrepreneurs hip | People and organizations that are thriving towards better societies, not only financial goals | Shaw (2004) |
| **13** | Creativity | The writers want to know the company's view on creativity and its connection and importance on B.o.P markets (RQ2) | Creativity | A process which leads to something new and useful | Maley (2003) |
| **14-16** | Transferring mindsets | The writers want input on what companies on developed market could/should learn from the company (RQ2) | | | |

| | | | | | |
|---|---|---|---|---|---|
| **17** | Profits | The writers want to know how profits are ensured (RQ1) | The Triple Bottom Line | Variables relating to financial balance | John Elkington (1994) |
| **18** | Planet | The writers want to know how the environment is being taken care of (RQ1) | The Triple Bottom Line | Variables relating to environmental impacts | John Elkington (1994) |
| **19** | People | The writers want to know how the people are being taken care of (RQ1) | The Triple Bottom Line | Variables relating to social impacts | John Elkington (1994) |
| **20** | General | The writers want the company's view on corporate social responsibility (CSR) (RQ1) | The Triple Bottom Line | CSR should not be a marketing tool | John Elkington (1994) |

### 4.2 Case Company Norway: Telenor and Easypaisa

Telenor Pakistan is a 100% owned subsidiary of the Norwegian Telenor Group. In 2010, Telenor launched its first mobile financial service offering, Easypaisa, in a country where 88 percent of the population did not have access to financial services and where only 16 million bank accounts existed, in a population of 180 million people (CGAP, 2010). The lack of accessibility to financial services was mostly prevalent in the rural areas, which is also home to 105 million people. Even though most of the people did not have a bank account, many people owned or had access to a mobile phone. After acquiring 51% of Tameer Microfinance Bank, Telenor was provided with a banking licence. Easypaisa was the result of these factors and it gave its customers fully functional (but virtual) bank accounts. Tameer Bank's customers could enhance their regular bank account with mobile functionality. To deploy the service, Telenor employed over 5000 agents and spread them over carefully selected locations to link the disparate and disconnected Pakistani population. Easypaisa provided financial services to the huge rural population of Pakistan, who until then, never had been able to access them due to the isolation. The initial service allowed payment of bills via the mobile phone, however, within a year Easypaisa provided more sophisticated services such as money transfers, retail purchases, settlements and cash withdrawals (Fundamo, 2010). Telenor Pakistan and Easypaisa is a valid case for investigation because it is a service aimed for end-consumers (but also B2B), it was launched in a B.o.P market and the innovation can be argued as disruptive, since it has taken market share from the traditional banks, i.e. it has to some extent changed the structure of the banking industry in Pakistan.

### 4.3 Case Company Belgium: MicroStart

MicroStart is one of the leaders in microloans in Belgium, the only location where they are active. The company offers loans up to €15,000, to make it possible for consumers to start an activity or finance a development. Most of the clients are unable to acquire a loan through banks, often because of precarious financial situations, such as having little or no capital or due to unemployment (Adrien Lippolis, 2017). Their vision is that "*every man or woman, regardless of income, education or origin, has a fundamental right to an economic initiative that allows them to take their destiny in their own hands*" (microStart, 2017). Beyond their role as a microcredit company, they offer counselling and training in many areas that customers need to start a business: management, accounting, marketing, sales, public relations, etc. A personal coach can also accompany the client through the many hurdles he or she might encounter while starting the planned activities. MicroStart is a social cooperative company (a form of commercial company) as well as a non-profit, which puts their social role at the very heart of the company's activities (MicroStart, 2017). MicroStart is a valid case company because it allowed the authors to answer RQ2 while adding perspective to RQ1. Microfinancing originally appeared in B.o.P markets and has been transferred to developed markets, by companies such as MicroStart, whose business model is intrinsically socially-oriented.

## 5. Discussion and Analysis

The three main strategies for achieving ***availability*** were: building networks, using established agents and close personal contact. The Swedish and Norwegian cases show that the companies contacted organizations and agents on the local market and developed a network from that; to reach the target markets and make the innovations available for consumers. The agents within the network would then be able to connect with the target market by close consumer contact. This follows the theoretical aspect of the 4 A's, since finding or setting up distribution channels is essential to be able to access remote locations. The companies were rarely in direct contact with consumers because of the use of intermediaries in the supply chain, the personal contact was rather achieved by the local agents and organizations. The concrete explanation to this was that the consumers would not trust an outsider, therefore the agents and organizations had to be locally embedded and known by the target market. As for the case of MicroStart, similar methods were used. The company did not use agents or organizations since the company was based in Belgium and its employees were locally embedded. Personal contact, without the use of agents, was another key aspect in making the service available to the target market.

> *"The key is to form collaborations with other banks. If only 20 percent of bank-excluded people were introduced to our service, Microstart would have enough projects to work through an entire year."* (A. Lippolis, personal communication, March 27, 2017)

To make the innovation ***affordable*** there were two main drivers shown from the three cases: finding money elsewhere and highlighting benefits by benchmarking. None of the three cases showed anything regarding reaching a mass and making the product affordable by large scale sales; which is what the 4A's typically discusses. The Swedish case showed that subsidized pricing was a demand since the target market could not pay the full price of the product. This was achieved by using actors within the network: organizations and governments. The first refers to lobbying banks to lower their interest rates when consumers take loans to buy the company's product. The latter demonstrate to governments the health benefits of the innovation and thereby making them invest in the infrastructure of the country, by making the innovation subsidized for consumers. Other than that, consumers themselves got together and saved money collectively to afford it. The Swedish company also targeted people living and making money in cities and convinced them to buy it for their family and relatives in rural areas. Lastly, the Swedish company worked with companies in the developed world, and sold "CSR-packages" to them; which basically means that these companies buy and donate the innovation to the people in the developing world and then use that in their marketing. This could then lead to enhanced value for those companies' customers since they could feel that by buying this, they help people in the developing world get access to clean water. According to the 4A's perspective, people in the B.o.P spend most of their income on food and survival; which means that a product falling into this category is more affordable, and dependent on the benefits of using the product. The case of Norway shows that benefits by benchmarking was needed, since the target market had to understand why they should choose the service over the already-established alternatives. The affordability part took time since it was more about convincing the target group about how safer their service is, and thereby the price could also be motivated.

> *"Easypaisa gives confidence that people now are told their wages and that they can go to collect his salary at one of our agents, by showing ID card. Before their salary was sent by the postman. They found it affordable since they never had to worry about losing parts or full amounts of their money. So we truncate out mass wastage, with this kind of way to distribute money."* (R. Bjærum, personal communication, March 29, 2017).

The case of Belgium shows that affordability was never an issue since their target group is formed by people who cannot get a loan elsewhere, which motivates the fact that the company's interest rates are higher than the banks'. The company takes risks that no bank wants to take, but still the company tries to collaborate with subsidies to lower the rates without it affecting the company.

To achieve consumer ***acceptability***, the Swedish case shows that extensive consumer research was made during the development of the innovation. To overcome culturally affected rejections, the CEO met with possible consumers and asked them what they thought of the prototype. Afterwards, the product was changed according to the possible consumers' input; which follows the 4A since the theory says that it is crucial for companies to get to know the consumers and their habits in depth. Since the product answered a need based on a true health issue and because it was easy for consumers to see the benefits of using the product right away; they could save money and time and improve their family's health conditions. Therefore, acceptability was not an issue for the Swedish company. In the Norwegian case, the idea of transferring money was not new, but the idea of doing it safely was new. This could be interpreted as if it could have been easy for the company to get the consumers acceptance since they were already transferring money, but the company struggled with convincing people to pay more money (than they already did) for buying something that they felt that they already had a solution for.

> *"It's like any other start-up business, one must have extremely high expectations for this and convince people about this. So, after a two years, things loosened up."* (R. Bjærum, personal communication, March 29, 2017).

To get the consumers' acceptance, the company worked hard at highlighting the benefits and showing consumers that it was a more profitable solution for them in the long run; since they would always know where their money is and the fee would always be the same; safe and convenient. It took the company some years to achieve consumer acceptance, perhaps the company did not know the consumers' habits well enough prior to launching the product. The acceptability factor is very much related to the availability factor; neither of the two companies would have gotten accepted without the use of local partners and agents. As for the Belgian case, the consumers that the company targeted were the ones that no other bank had accepted, which is why it was easy for them to achieve acceptance from the target group - they had no other choice if they wanted to borrow money. The company transferred the idea of trusting the untrusted, from the B.o.P to a developed country, and served an unserved market.

To create ***awareness*** of the product, the Swedish case shows that traditional marketing channels such as TV, radio and the internet were not available, as the 4A's perspective prevailed. Therefore, the company used social engagement to promote the product; agents were sent to villages to talk about it, which lead to word-of-mouth spread by the consumers. As Petra Wadström said in the interview:

> *"It was like people, as on the picture you see the women dancing around Solvatten in Kenya, they were, they called it the magic box. They blessed Solvatten. And they thought it was amazing."* (P. Wadström, personal communication, March 21, 2017).

The Norwegian company could draw benefits from belonging to a well-known brand; this gave the company a lot of media coverage and access to an existing sales network, since the big brand that it belonged to already knew the market and vice versa. Therefore, the Norwegian case did not follow the 4A's, since the company could use traditional marketing channels on their specific market, though, the advertising was adapted to fit local needs regarding language, culture and religion, which does follow the 4A's. The Belgian case shows the social engagement strategy; the company targeted the group and became visible in areas where the target group had been predicted to be. Informative flyers were personally distributed by the company's employees, in the city centre, near other banks and outside the unemployment office, for example.

### 5.1 The Triple Bottom Line

MicroStart is as previously mentioned, a social cooperative company, i.e. a commercial company created with the specific intent to have a positive social impact, people are thus at the very core of their business. The company offers loans to people who are thought to be insolvent by banks and, thus rejected from the classic loan industry because of precarious financial and personal situations. The company offers the possibility to pull themselves, their family, and their community out of precarity. MicroStart finances projects and accompanies customers through the many struggles of starting an activity. The company uses surveys to measure variables related to the social aspect of the TBL, i.e. to measure the impact on communities and people they are involved with:

> *"We measure our social impact through surveys, that among other things have shown that 60 percent of the businesses we have helped to create are still alive after 3 years and 20 percent of them changed activity but are still operating."* (A. Lippolis, personal communication, March 27, 2017)

Solvatten was founded with one idea: helping people get access to clean water. Petra Wadström, the CEO of Solvatten, insisted on the fact that Solvatten was created to respond to an existing need of vital importance. Having a positive social impact is thus the very reason for the company's existence. Solvatten cooperated with Uppsala (SLU) Landsuniversitetet to measure the social return on investment through an impact calculator, which measured health improvements and time savings. The calculator also considered as diverse factors as household savings, area of forest saved and number of sick days as an effect of having a Solvatten. Even though Petra said that it is hard to put money on the social impact, the estimation was a return of twenty-six dollars for each dollar that the company had invested. This type of calculator is what the TBL suggests for companies interested in measuring their social impact.

Easypaisa was developed to offer access to banking solutions. Through the project, two major impacts on communities where they were active could be found. First the agent network grew from 3000 to 60,000 agents in a few years. Those agents now have a job that offers them stability and comfort. Secondly, only a small part of the population had access to banking systems (mostly located in big cities) before Easypaisa. Other than facilitating daily exchanges Easypaisa allows consumers to rapidly send money when they need to. When consumers have severe money shortages, they tended to limit their spending on food or education, which is not necessary with Easypaisa. Easypaisa's main social impact is that the company has made banking services more accessible and safer to use.

The companies studied in this paper were developed on the idea of providing a solution for a specific consumer need. Thus, their primary concern is with **people**. The second most important factor is to take care of the environment. Taking Solvatten as an example: they offer a solution for producing drinkable water, mostly to Sub-Saharan Africa. The impact of their products on communities is tremendous. Even though the environment (**planet**) was not the primary concern, Solvatten has had, and will continue to have a positive impact on it as the use of firewood for boiling water is reduced, which lead to less wood cutting and more trees to stay in the forest. Furthermore, most of the companies with social impact as a main goal are confronted with difficulties to stay or become **profitable**. With all existing constraints, most of the companies must make a choice regarding the impact they have on the planet. The environmental concern is most of the time difficult to balance with financial success. MicroStart prefers to loan money to eco-friendly projects but is not opposed to financing exports of old automobiles to Africa, for example. People are thereby being prioritized before the planet. Though the possibility of being both social and ecological is preferred, it is difficult to achieve. However, since MicroStart and Telenor are mostly service businesses, their environmental impact is quite low. Indeed, environmental variables considered in the TBL are mainly the impact on air and water quality, as well as energy and land, which are negligible compared to a manufactured product such as the one Solvatten offers. Solvatten's innovation is however, an energy saver since it runs on solar energy, which is friendlier towards the planet in the long run. The innovation rather has a positive effect on air and water quality since that goes hand in hand with the need the product is developed from.

When looking at sustainability from the TBL perspective, we also need to consider the economic side of the equation, i.e. look at the variables that contribute to the financial balance of a company. Both MicroStart and Solvatten emphasized the difficulty of balancing economic viability with their social goals. Therefore, they both use as many financial aids and funders as possible, mainly in the form of subsidies from public institutions. Solvatten also relies on a system where a company in Sweden pays for the product to be delivered to a family or community in a developing country, essentially a form of charitable donation. MicroStart is not profitable, though the company aims to break-even through several changes. On the other hand, they are automating parts of the application process, a change that cuts cost by reducing the work time of counsellors, the major cost at MicroStart, but consequently reduces the social role they play for the client. Diversifying the offering through products such as micro insurance or loans of higher value, is also considered. Telenor insisted on the importance of a positive cash flow, even though the company lost money for three years before achieving profits. Telenor does not think that being highly appreciated for its actions is a goal that justifies losing money. It could be said that their main driver is financial sustainability, i.e. making profits.

**5.2 Creativity**

There is one significant difference between developing markets and developed markets – in developing markets the need is answered, while in the developed marked the need is created or argued for. According to Petra from Solvatten, social engagement is lacking in the developed world and that that is the biggest difference between developing and developed markets. In developing markets, it is not about making money for the month, it is more about long-term impacts through investments.

> *"Companies should think more about solving problems, instead of increasing consumption and creating needs that do not exist. The developed markets should increase the care for their stakeholders."* (P. Wadström, personal communication, March 21, 2017)

Starting up a new creative idea in a developing market can be tough. The competition is different from the developed market. Roar from Telenor said:

> *"...the main difference between these markets is that people tend to think the opposite way. In developing markets, there is more passion, and people are more driven to achieve their goals. They are more ambitious, and work a lot harder than what Telenor experienced in western countries."* (R. Bjærum, personal communication, March 29, 2017).

The willingness to succeed is extreme, mainly because of the tough competition. As a multinational company, Telenor has experienced that having one corporate identity and mind-set throughout several markets does not work out. The authors find MicroStart to be a good example of a company that has transferred elements of mind-sets from companies operating in developing countries. Due to heavy regulations in Belgium (and in other developed markets), the threshold for receiving a loan is usually high and the consumer needs to fulfil several criteria. MicroStart got inspiration from developing countries in terms of trusting their consumers, even though they were in precarious situations. It is worth mentioning that it is not fully transferable, since the starting capital for receiving microcredit in the developing world is very low, but in Belgium it is rarely less than 7000$. This gives a microcredit-company (and other companies) operating in a developing country a much higher risk, but these companies are also less-willing to take that risk.

As mentioned, products introduced to developing markets were invented to fill an empty hole (an existing and important need). The products tended to be completely new, innovative and disruptive. In the case of Solvatten, the consumers were in desperate need of that sort of solution. Even though Solvatten said that the innovation was not disruptive, Solvatten's way of thinking might rather be. Entrepreneurs in the developed world could harvest success by being more willing to take risks, they need the encouragement to start. When Telenor was asked if the company categorized Easypaisa as disruptive, the company said that it would rather be categorized as an assembled innovation. For Telenor, this meant combining already-existing services to launch a new, cheaper and more convenient offering. As more consumers in developed markets tend to look for cheaper options, the idea of assembled innovations could pique the interest of entrepreneurs that are active in developed markets.

**6. Conclusions**

The research questions will be answered in this section:

> ***RQ1***: *How can (social) entrepreneurs (or any companies) adapt the 4A perspective to introduce disruptive innovations and still maintain their sustainable, responsible and ethical approach?*
> ***RQ2***: *How can the mind-set of innovation and creativity at the bottom of the pyramid in developing markets be transferred to social entrepreneurs in developed markets?*

Achieving availability on a market where infrastructure is lacking excludes traditional methods for making the product available for consumers. This research has shown that building networks with local agents and organizations is the main strategy for making the products ***available*** to consumers in B.o.P markets. This was achieved by having close personal contacts, which were essential to build up new distribution systems. This research also highlighted that making the product ***affordable*** for the target group and making profits from a market with low cash flow demanded creativity; finding money elsewhere and making people with money pay for the product as well as extensive emphasis on safety, convenience and health benefits. As for getting the target group to accept the product, this research has shown that it is imperative to have an in-depth knowledge about the target group and its habits, as well as having patience and not to expect success overnight - the long-term perspective on business is required for achieving ***acceptability*** in B.o.P markets. This research has shown that to create ***awareness***, the product has to speak for itself. It must be a truly great product which answers to an existing and important need. To some extent traditional media channels can to be used in some countries in the developing world, however, not in all. Therefore, social engagement is essential when promoting products to people in rural areas.

The findings conclude that one of the hardest aspects of running a company aiming to be sustainable is finding the right balance between the three P's: ***planet, people, profit***. The three companies studied were socially oriented. Yet, for two of them, the primary objective was to improve quality of life by answering customer needs. Profits were needed to finance the activities and keep the business afloat, but it was not a main objective. Most projects must be subsidized by public institutions, NGOs or private partners to get the product or service to the market. The third also filled a void to answer customer banking needs, though their focus was to have a positive cash flow, thus showing the importance of profits in the company vision. By improving financial security for many people, however, their social impact is tangible. All the studied companies aim to attain profit by improving quality of life; environmental considerations were an afterthought and a positive side-effect. It is an extremely tough challenge to start a company and break even. Thus, it should not be a surprise that balancing financial realities with environmental and social considerations can sometimes seem impossible. Therefore, it may be necessary to think of a company as one or the other, firstly as a social impactor and secondly as an environmental impactor; one of the two will have a bigger role.

Transferring one mind-set from a developing market to a developed market can be difficult. These markets have different needs and preconditions and for any company operating in one of these, it is crucial to be adaptable. The case of MicroStart is an example of how that mind-set can successfully be transferred even though western regulations make the enterprise more hazardous. Furthermore, entrepreneurs with any interest in learning from those adaptations could succeed between those drastically different markets.

The 4A's perspective has proven to be an effective tool while approaching B.o.P markets. Companies will have to think outside the box of traditional marketing to achieve their goals. In these dynamic markets, a company will struggle to keep up with all constraints. The studied companies struggled most with integrating sustainability without compromising profitability.

## 7. Limitations and further research

This paper contributes to the literature of the already established 4A's perspective and the TBL framework by providing in-depth research, by investigating companies and their operations from three different countries (Sweden, Norway and Belgium). Originally the authors planned to find ways in which companies could achieve profitability while maintaining their ethics. The ethical part demands a more in-depth analysis of each company. Due to time limitations, this was not achieved and is recommended for future studies.

Three interviews with three different companies gave a hint to how companies from the developed world operate in B.o.P markets. To further validate the results the sample size should be larger, including several different companies and informants. A larger number of informants would also reduce the possibility of bias and innovation or situationally based answers. The differences in the nature of the selected companies might be proven too large to generalise the results. Further research is needed to compare the findings from this study in similar industries and markets. As written in the definitions, B.o.P markets differ substantially from country to country and should not be treated as one united market.



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**Appendix I**

Interview questions

1. Why did you choose a developing market?
2. How would you describe the market you have most presence on?
3. How did you initially get to that market?
4. What was your strategy to enter it?
5. What was the most difficult part in launching your company in a developing market?
6. What was easy when you launched your company in a developing market?
7. How was your innovation first perceived by customers?
    - What did you do to overcome possible consumer resistance?
8. How did you manage to promote your product?
9. A lot of villages in developing countries are hardly accessible, how did you manage to get access to those remote locations?
10. Many people in the developing countries live with less than 2$/day. What have you done to ensure that those people can get your product?
11. In what way is (could … be) your innovation disruptive?
    - What role did it play for you to access the market?
12. How would you describe a social entrepreneur?
13. How would you describe creativity?
    - How did creativity help you to get to the developing markets?
14. What advice would you give to start-ups wanting to follow in your steps?
15. How would you describe the main differences between operating developed markets and developing markets?
    - Similarities?
16. How do you think that companies in the developed markets could learn from the mindset of companies located in the developing markets?
17. How do you ensure your long-term profitability?
18. Do you measure your environmental impact? How? Have you put specific policies in place to minimize it?
19. Do you measure your social impact? How? Have you put specific policies in place to have a positive impact on stakeholders (customers, employees, communities where your company is implanted)?
20. How would describe social responsibility?
    - What can companies in developed markets learn from you?

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# Monetary Policy Transmission Mechanism in a Small Open Economy under Fixed Exchange Rate: An SVAR Approach for Morocco

Rachid Ouchchikh[1]

[1]INREED, Faculty of Economics, Cadi Ayyad University, Morocco

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ABSTRACT

**Purpose**
The main purpose of this study is to investigate the transmission mechanism of monetary policy in Morocco, taking external constraints on monetary policy into consideration.

**Design/methodology/approach:**
This study uses a structural vector autoregression model (SVAR) to examine the transmission of the effects of a positive monetary policy shock to the real economy.

**Findings:**
The analysis provides evidence that monetary policy shocks are transmitted to the Moroccan economy principally via credit and interest rate channels. However, the exchange rate and asset prices channels are inoperative. Furthermore, the findings show that the monetary aggregate contains important additional information in the transmission of monetary policy shocks.

**Research limitations/implications**:
Generally, the analysis leads to three policy implications. First, when analyzing the transmission mechanisms in Morocco, it is important to take into account the effect of externals shocks on monetary policy, since it allows a better appreciation of the effect and the functioning of the transmission channels. Second, since Moroccan authorities prepare its transition to an inflation targeting strategy, the functioning of the interest rate channel is important. However additional efforts are needed to develop a more resilient, competitive and dynamic financial system, to diversify the financing alternatives for the private sector, and to establish a more flexible exchange rate. Third, given the fact that the bank credit is a strong transmission channel and constitutes a major source of external financing for the Moroccan economy, it is crucial in the health and stability of the banking system as a pre-condition towards economic stability.

**Originality/value**:
To our knowledge, this study is the first investigation of transmission channels in Morocco using recent econometric techniques and taking into account the external constraints on monetary policy.



## 1. Introduction

It is widely accepted in the economic literature that monetary policy has a short-run real effect and a long-run impact only on prices. These effects pass through to the economy via many mechanisms that may be generally defined as the process through which monetary policy decisions are transmitted into changes in income and inflation (Taylor, 1995). Understanding the transmission mechanism (in terms of timing and magnitude) is essential in achieving a successful monetary policy. The transmission mechanism includes the interest rate channel, the credit channel, the asset prices channel and the exchange rate channel.

Because of its close dependence upon the economic and financial structure, these mechanisms differ from country to country. A large number of empirical studies has been undertaken in developed countries, and to a lesser extent in emerging and underdeveloped countries. However, these studies do not reach the common trend that clarifies the transmission process.

Contrary to developed economies, the under-developed and emerging economies are subject to monetary policy dictated by the world's main central banks such as the European Central Bank and the Federal Reserve Bank. Consequently, the modeling of monetary

†Corresponding Author: Rachid Ouchchikh
E : ouchchikhra@yahoo.fr
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transmission mechanisms for those countries should be different from that of the developed countries. The negligence of such a characteristic may bias the result and generate empirical puzzles. Moreover, if the exchange rate is fixed, as in Morocco, monetary policy becomes more constrained because of its dependence[1] on the level of official foreign reserves[2] and on the interest rate of the country to which the exchange rate has been fixed.

The study of transmission mechanisms of monetary policy (TMMP) in the Moroccan case is interesting because of the deep liberalization of the domestic financial system and the adoption of market-oriented monetary policy instruments and operating procedures. In this new framework, the issue of transmission channels has recently gained the attention of the Moroccan policymaker. However, from an academic point of view, a few studies have investigated Moroccan monetary policy transmission channels (Boughrara, 2008; Ouchchikh, 2014). To the best of our knowledge, this study is the first to consider the external constraints on the Moroccan case. This study investigates the transmission channel by taking account of the external constraints on monetary policy. Particularly, it examines four channels of monetary transmission in Morocco, namely the interest rate channel, the credit channel, the asset prices channel and the exchange rate channel, in the presence of exogenous external shocks.

The organization of the paper is as follows. The following section gives a short review of the literature on monetary transmission mechanisms. The data research methodology is presented in Section 3. Section 4 reports and discusses the results. Section 5 concludes the study.

## 2. Literature Review

Due to its potential to impact the real sector, monetary policy has recently been subject to intense academic debate. While it is widely accepted that monetary policy is ineffective in the long-run and has a powerful effect on economic activity in the short-run, New Open Macroeconomics asserts that monetary policy can also have a strong impact in the long-run. Bernanke and Gertler (1995) and Morsink and Bayoumi (2001) describe the TMMP as a black box. Efforts to understand these mechanisms have given a raise to a large body of theoretical[3] and empirical work[4]. Economists have investigated a wide range of channels through which monetary policy may influence the economy. Commonly, these include the following: the interest rate channel which stresses that, in the presence of price rigidity in the short-run, monetary policy may impact the real interest rate, which in turn influences the aggregate demand through the cost of capital and substitution and income effects.

In the monetarist asset price channel, monetary policy affects the economy by means of its impact on asset prices and real wealth. Thus, an easing of monetary policy appreciates asset prices and, therefore, promotes investment as described by Tobin's q theory, and consumption through wealth and liquidity effects.

The exchange rate channel postulates that when the economy is open, a monetary contraction will increase the domestic interest rate up to the foreign one and, thereby, appreciates domestic currency in nominal and/or real terms. Accordingly, this appreciation impacts the economy through international competitiveness and the costs of imported goods.

Finally, the bank lending channel seeks to assess the role of banks in transmitting and amplifying the effect of monetary policy. In this vein Bernanke and Blinder (1988) expanded the standard IS-LM model by including the bank loans market. Based on the presence of asymmetric information on the credit markets, the credit channel supports the interest rate channel. Indeed, monetary contraction reduces bank reserves and in turn the supply of loans, which may drop investment and consumption expenditures for bank-dependent borrowers.

Transmission channels are not similar in all economies, because they depend on specific features of the economy, such as the structure of the financial system (Cecchetti, 1999). Indeed, the effectiveness of these channels is an empirical issue that varies from one country to another.

The VAR models are the most widely used empirical methodology to analyses the TMMP (Mojon and Peersman, 2003), since the seminal work of Sims (1980). Bernanke and Blinder (1992) found that in the United States, monetary policy affects composition of bank assets. However, Ramey (1993) concludes to the predominance of the money channel in transmitting the monetary policy shocks in the same country. Taylor (1995) emphasizes strong evidence of the importance of the interest rate and exchange rate in the transmission process, as opposed to financial quantities. This result, nonetheless, is criticized by Bernanke and Gertler (1995) that stress the importance of financial market quantities i.e. credits. Morsink and Bayoumi (2001) and Suzuki (2004) conclude that the lending channel is effective in Japan. Angeloni et al. (2003), find that the interest rate channel is dominant in Germany, Belgium, Finland, Spain and Luxembourg. In an extensive literature survey, Boivin et al. (2010) emphasize the importance of neoclassical channels (such as direct interest rate effects on investment spending, wealth and intertemporal substitution effects on consumption and the trade effects through the exchange rate) in macroeconomic modeling.

In the case of developing countries, the transmission process is even more uncertain (Kamin and Van't dack, 1998). Ganev et al. (2002) highlight, on the basis of a survey of 40 empirical studies in Central and Eastern European countries, the weakness of the first stage of TMMP (propagation of monetary policy actions to

[1] However, this dependence is alleviated as long as the central bank have limited capital mobility, due, for instance, to the keeping of some capital controls or to the presence of an underdeveloped financial markets.

[2] Since the central bank intervene in the foreign exchange market through sterilized interventions in order to preserve the fixed exchange rate parity.

[3] See among others Mishkin (1995), Meltzer (1995), De Bondt (1997), Walsh (2003) and Mishkin (2007) for an extensive survey of the TMMP.

[4] See in particular Angeloni et al. (2003), Boivin et al. (2010), Ganev et al. (2002), Mohanty and Turner (2008) and Mishra and Montiel (2012) for an empirical literature review.

lending and deposit rates) and the absence of the second stage (diffusion of variations of intermediate variables to ultimate goals such as investment, consumption, growth and inflation). Most authors have justified these results by the institutional factors like the underdeveloped banking sectors, weak competition among banks and the constant changes in monetary policy. Disyatat and Vongsinsirikul (2003) found the functioning of the bank lending channel in Thailand. While Al-Mashat (2003) uncovers a small role for banks in transmitting monetary policy shocks to the real sector, the results of Aleem (2010) supports a more active role for banks in the transmission process in India. In a survey on the effectiveness of monetary policy transmission mechanisms in low-income countries, Mishra and Montiel (2012) stress that bank lending is the only operating channel in those countries.

## 3. The econometric methodology

We propose that the Moroccan economy may be described by the following structural VAR system:

$$Y_t = A(L)Y_{t-1} + B(L)X_t + C^* D_t + \varepsilon_t \qquad (1),$$

where $Y_t$ is a vector of endogenous variables and $X_t$ is a vector of exogenous foreign variables. $\varepsilon_t$ is the vector of structural innovations, $D_t$ contains a deterministic terms i.e. a constant and one dummy to capture the revision of the basket of Dirham in April 2001. The exogenous foreign variables is included to capture external constraints and to control for foreign economics events. By assuming these variables as exogenous, we suppose that they do not have a contemporaneous impact on the endogenous variables, and changes in the domestic economy have no effect on the exogenous variables.

The vector of endogenous variables consists of the industrial production index (IPI), consumer prices index (IPC), the monetary aggregate (M2), the credit to private sector (CBP), the nominal effective exchange rate (NEER), the six-month Treasury Bill rate (TB6) and, finally, the Casablanca stock market index MASI (*Moroccan All Shared Index)* as a proxy to the asset prices:

$$Y_t' = [IPI_t, IPC_t, M2_t, CBP_t, NEER_t, TB6_t, MASI_t]'$$

The vector of exogenous variables contains a Germany money market interest rate ($i^*$) and the euro area industrial production index ($IPI^*$): $X_t' = [IPI_t^*, i_t^*]'$.

Due to the fixed exchange rate regime, the implementation of Bank Al-Maghrib's (BAM) monetary policy focuses on the variations of the targeted exchange rate and on changes in the anchor country interest rate. Given that the external value of Dirham has been set on the basis of basket of currencies for which the composition was limited since 2001 to the euro and dollar, with the respective weights are 60 and 40 %, it seems reasonable to retain the short-run euro area interest rate to capture the effect of the anchor country's monetary policy. However, for the reason of the unavailability of such interest rate during the studied period, we retain the Germany money market interest rate because this country is the anchor[5] of the European Monetary System.

Furthermore, Morocco is a small open economy and heavily dependent on the European Union (EU) since it is considered its first client, supplier and purveyor of influx of tourists and the major source of transfer of funds by Moroccans living abroad. In 2011, this group of countries represented 50.8% of foreign trade, 47.6% of imports and 57.7% of exports. At the same time, the amount of foreign direct investment coming from this group to total foreign direct investment is 57.8% and the tourist influx approximate 3.9 million, while the remittances flows make up 74.6% of the total transfer of funds by Moroccan living abroad. Indeed, the Moroccan economy is particularly exposed to shocks that are related to EU economies. In fact, the EU gross domestic product seems to be a good variable for world demand. Nonetheless, the unavailability of data on such a variable during the studied period leads us to retain the euro zone industrial production index at 17 countries[6].

The model is estimated on the basis of the monthly data spanning the period 1992M1 to 2011M12. The data is sourced from the IMF *International Financial Statistic* and Bank Al-Maghrib databases, the annual reports of Bank Al-Maghrib and from the Casablanca stock market and the Bundesbank websites. Except for the interest rates, all series are transformed into logarithm values. Moreover, the series IPI, IPC, M2, CBP, MASI, and IPI*[7] are seasonally adjusted.

To establish the order of integration of the time series, Augmented Dickey–Fuller (ADF), Phillips Perron (PP), and the Kwiatkowski, Phillips, Schmidt, Shin (KPSS) tests are performed for all the variables. All in all, the tests give strong evidence that the variables are stationary in the first difference[8]. The reason we examine the cointegrating proprieties of the data is that they may share common stochastic trends (cointegrating relationships). Because the model includes a shift dummy, we use the cointegration test introduced by Saikkonen and Lütkepohl (2000) instead of Johansen's trace test (Johansen and Juselius, 1990). When the shift dummy variable is included in the model, the latter test is no longer appropriate since their critical values are calculated for the case where the shift dummy is not included in the deterministic terms. The presence of this dummy impacts the asymptotic distribution under the null hypothesis, thereby becoming inappropriate. To remedy this limit, Saikkonen and Lütkepohl (2000) introduced a test that is asymptotically unaffected by the presence of the shift. When this test is used to test for common stochastic trends in data, the null hypothesis of no cointegration cannot be rejected (see appendix 2).

[5] Indeed, the Germany's monetary policy is the anchor for others monetary policies in Euro Area. In that sense, many studies support that the Germany's monetary policy influence the domestic monetary policies (Henry and Weidmann, 1994; Smets, 1997; Mojon, 1998; Bruneau and De Bandt, 1998; Kim, 1998; Clements et al., 2001; Mojon and Peersman, 2003; among others).

[6] The countries included are Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovakia, Slovenia and Spain.

[7] This is done by the TRAMO and SEATS program.

[8] Detailed results from the unit root and stationarity tests are reported in appendix 1.

Thus, we choose to estimate our SVAR model in level[9]. This approach is common in the literature (see Sims, Stock, and Watson, 1990; Cushman and Zha, 1997; Amisano et al., 1997; Ramaswamy and Sloek, 1998; Bernanke and Mihov, 1998; Kim and Roubini, 2000; Elbourne, 2008; Ouchchikh, 2014 amongst others). Moreover, in view of the fact that Phillips (1998) stressed that impulse responses from VAR in levels are inconsistent at long-run horizons and Faust and Leeper (1997) demonstrated that imposing inappropriate cointegration relationships can lead to biased estimates of the short-run parameters, the reasonable approach seems to be estimating the model in levels concentrating on the short-run dynamic.

The residuals from the reduced form estimation of equation (1) can be related to the structural shocks, as in Breitung et al. (2004), by the following general structure model:

$$A\mu_t = B\varepsilon_t \tag{2}$$

In order to identify the structural form of the model, we adopt the identification scheme as illustrated below. Given that the primary concern of this paper is in short- and medium-term dynamics, we use contemporaneous restrictions on the A matrix to identify the shocks as in (3). This avoids the misspecification problem associated with long-run restrictions (Faust and Leeper, 1997), because of the inadequacy of those restrictions to recover the true structural shocks. More recently, Erceg et al. (2005) and Chari et al. (2005) have questioned the ability of the long-run restrictions in the SVAR to recover accurately the shocks. Christiano et al. (2005) showed that the short-run restrictions perform remarkably well compared with the long-run restrictions.

The behaviors of endogenous variables are explained by seven structural disturbances, namely the aggregate supply shock ($\varepsilon^{AS}$), the aggregate demand shock ($\varepsilon^{AD}$), the money-demand shock ($\varepsilon^{MD}$), the credit shock ($\varepsilon^{CBP}$), the balance of payment shock ($\varepsilon^{BP}$), the monetary policy shock ($\varepsilon^{MP}$) and the asset prices shock ($\varepsilon^{MASI}$). The AB-model is written as:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & a_{36} & 0 \\ a_{41} & a_{42} & 0 & 1 & 0 & a_{46} & 0 \\ a_{51} & a_{52} & 0 & 0 & 1 & a_{56} & 0 \\ 0 & 0 & a_{63} & 0 & a_{65} & 1 & a_{67} \\ a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & 1 \end{bmatrix} \begin{bmatrix} u_{IPI} \\ u_{IPC} \\ u_{M2} \\ u_{CBP} \\ u_{NEER} \\ u_{TB\ 6} \\ u_{MASI} \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & b_{55} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & b_{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & b_{77} \end{bmatrix} \begin{bmatrix} \varepsilon^{AS} \\ \varepsilon^{AD} \\ \varepsilon^{MD} \\ \varepsilon^{CBP} \\ \varepsilon^{BP} \\ \varepsilon^{PM} \\ \varepsilon^{MASI} \end{bmatrix} \tag{3}$$

The first two equations summarize the equilibrium conditions in the goods market. They represent the sluggish reaction of the real sector (output and prices) to shocks in the monetary sector (interest rate, exchange rate, monetary and credit aggregates, and asset prices). There is no contemporaneous effect of money demand, credit, exchange rate, monetary policy, and asset prices shocks on output and prices. The third row may be interpreted as a short-run money demand relation assuming that money demand responds contemporaneously to output, prices and interest rate. The fourth row corresponds to the loan supply equation as in Ehrmann et al. (2003), where the credit is a function of interest rate, output and inflation. The fifth equation designates the balance of payment function according to De Arcangelis (1997) and Camarero et al. (2002), since Morocco is a small open economy. The sixth row refers to the central bank's reaction function where BAM react contempouraneously to the monetary aggregate, exchange rate, and asset price. Finally, the asset price react immediately to all other innovations.

In selection of the autoregressive order of the model, the information criterions (AIC, FPE, SC, and HQ) gives a number ranging from 1 to 9[10]. However, based on misspecification tests and the need to capture the dynamic of transmission of monetary policy satisfactorily, we choose to estimate our model with 8 lags. Furthermore, the shift dummy variable included in the model obtains a value of one from 2001M5 onward and zero before. For each point estimate, we construct a 95% bootstrapped confidence intervals using Hall's method as proposed by Benkwitz et al. (2001), with 300 bootstrapping replications in order to show the uncertainty associated with the points estimates. The restrictions imposed in (3) were estimated by maximum likelihood through the scoring algorithm of Amisano and Giannini (1997). Compared to the just-identified model, the over-identifying restrictions imposed on the structural covariance matrix are not rejected by the LR (*Likelihood Ratio*) test at 5% confidence levels, with a p-value of 0.6086. Thus, the restrictions imposed are supported by Moroccan data.

Before initiating the analysis, our model was submitted to misspecification and stability tests (see appendix 3 and 4). The Ljung-Box (LB) and Lagrange Multiplier (LM) tests for residuals autocorrelation and the multivariate autoregressive conditional heteroscedasticity test (MARCH-LM) for ARCH effects in model residuals do not indicate any major concerns about the model adequacy. Concerning the Jarque-Bera test, the null hypothesis of normality is rejected for all residuals except those of IPI and TB6. Nevertheless, in spite of the non-normality, the VAR model still yields the consistent and unbiased estimates (Gonzalo, 1994; Brooks, 2008, p.164). To test the stability (stationarity) of the model, the inverse roots of the characteristic AR polynomial are reported in appendix 4. The latter shows that all inverse roots of the characteristic AR polynomial have modulus that they lie inside the unit circle, showing that our model is stable or stationary. As the following section will show, this stability is also illustrated in the impulse response functions that indicate no sign of explosion. They die down with time. Consequently, our SVAR is a satisfactory representation for Moroccan data.

## 4. The empirical findings

Most of the coefficients of the matrix A have the signs consistent with theory predictions. The coefficient for

[9] Because the OLS (Ordinary Least Square) method still yields a consistent estimate of parameters of the model even if the series are I(1) (Hamilton 1994, p.652).

[10] The numbers of lags selected are 1 for Schwarz Criterion (SC), 2 for Hannan-Quinn Criterion (HQ), 3 for Final Prediction Error (FPE), and 9 for Akaike Info Criterion (AIC).

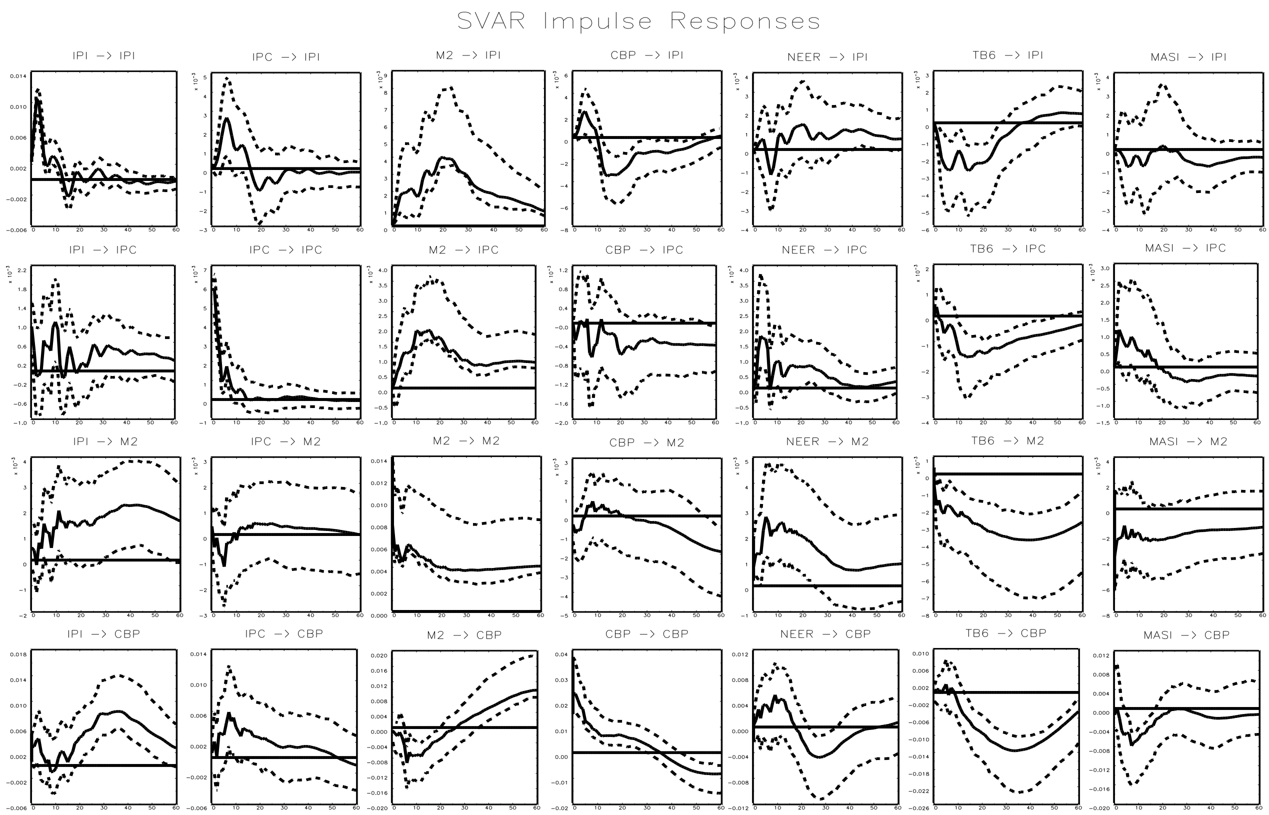
monetary aggregate ($a_{63}$) has the expected negative sign. Moreover, the coefficients associated with the exchange rate ($a_{65}$) and the asset prices ($a_{67}$) have the positive signs. However, a few coefficients are statistically significant and as a result more information may be derived from structural impulse response analysis and variance decomposition.

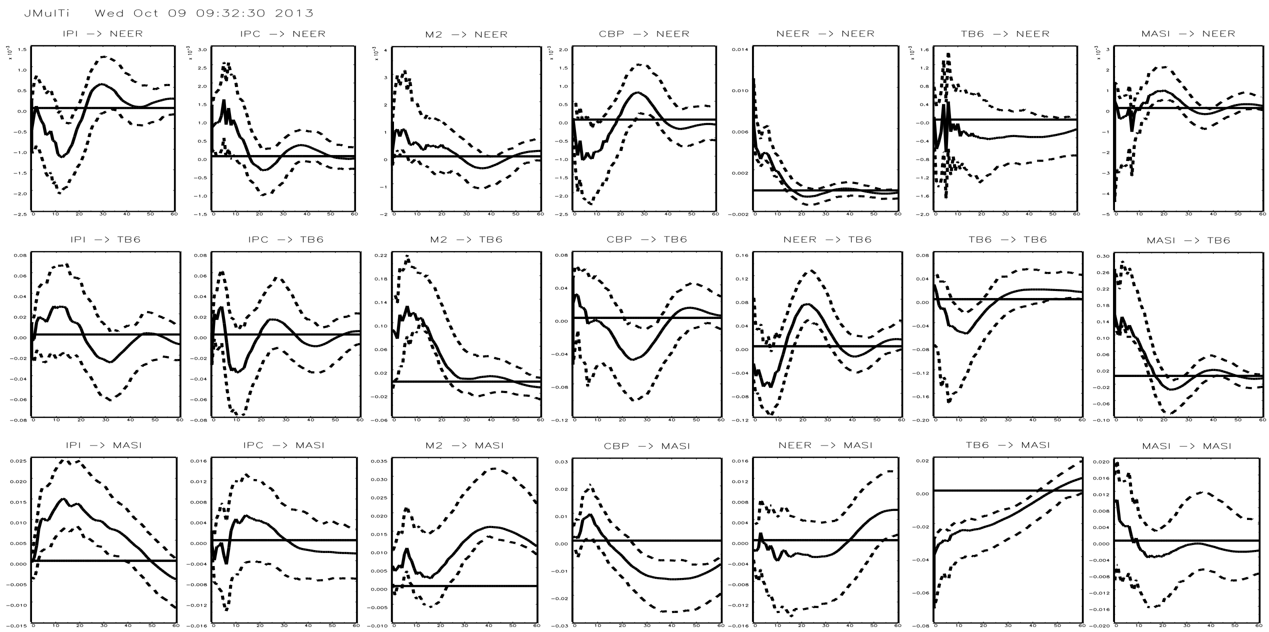
### 4.1. Impulse response

Figure 1 shows the results of the impulse response functions. The dotted lines represent 95% bootstrapped confidence intervals and the responses up to 5 years ahead are considered. The values on the vertical line correspond to the deviation from the baseline level of the variable in response to a considered shock. The values on the horizontal line represent the time passed after the occurrence of the shock. Each column corresponds to the effects of one shock on the variables, whereas each line reflects the effects of different shocks on the same variable.

To begin the analysis, we focus on the responses to positive monetary policy shock of a magnitude of 3 basis points (sixth column of Figure 1). Our results emphasize that the reactions of all variables are in accordance with the economic theory: output, prices, money, credit, exchange rate, and asset price fall. The monetary policy shock leads to a statistically significant decrease in real output with a peak effect of -0.28% occurring after fourteen months, as predicted by Keynesian models with price-wage inertia. In line with the assumption of a transitory impact of monetary policy, output converges slowly to its pre-shock level. Interestingly, the same shock also causes a significant decline in the price level, peaking at -0.16% below the baseline after sixteen months, suggesting that BAM control the prices level by its interest rate. However, we note that this reaction is significant from the tenth month. Compared with the output, the response of price is more persistent. The monetary policy shock leads to a significant and persistent decrease in M2 and reach their lowest point after three years at -0.38%. This result highlights a significant liquidity effect which indicates the sensitivity of BAM's intermediate target in the monetary policy instrument.

**Figure 1-** Impulse response functions






Credit to the private sector also contracts significantly but after one year delay. The peak effect is reached after thirty-three months at -1.36%, unveiling the ability of BAM to influence the quantity of credit. The rigidity of this reaction may be caused by the contractual nature of credit, the concentration of the banking sector and by the importance of cash savings in the Moroccan banking system. The response of exchange rate, although consistent with economic intuition i.e. a decline, is not significant due to the fixed exchange rate regime. Thus, there is no evidence that the exchange rate is driven by monetary policy shocks. Finally, the asset price decline immediately and significantly by -3.9% and converge slowly to its equilibrium level.

At present, we look to the effects of the monetary aggregate, private credit, exchange rate, and asset prices on output and prices. Both output and consumer prices respond significantly to unexpected changes in M2. A sudden increase of approximately +0.8% in M2 boosts significantly the output after a period of one month, peaking at +0.4% above the baseline after nineteen months and still significant up to 5 years. Likewise, prices level increase after a period of one month. This reaction is significant and persistent with a magnitude of about +0.19% at ten months. The output responds significantly and temporarily to a +2.32% unexpected increase in the bank lending with a rise, peaking at +0.24% after five months. However, the effect of credit shock on prices is non-distinguishable from zero and inconsistent with the theoretical expectations (i.e. negative feedback). Moreover, an unexpected increase of about +0.66% in the exchange rate has no statistically significant effect on output. On the other hand, prices rise but after one-month, with a peak impact of +0.17% occurring after three months. The response is significant up to six months. Finally, the effect of a sudden +0.93% increase in asset prices on output and prices is not statistically significant. This result is natural since Moroccan stock market is limited to a few firms and insufficiently developed.

### 4.1. Variance Decomposition[11]

When the impulse response functions pin down the impact of a shock of a given variable on the remaining variables in the VAR model, the variance decomposition gives information about the relative importance of each shock hitting the VAR in explaining the variability of each variable in the model at different horizons. Table 1 shows the variance decomposition of output and prices computed at forecast horizons up to 5 years. It is clear from this table that the variation in output and prices come mainly from their own shocks. After two months, 99% and 97% respectively of the variance of output and prices are explained by their own shocks. In addition, 34% of the variability of these variables is sourced from their own shocks after five years.

Now we examine the relative strengths of various channels through which monetary shocks are transmitted to output and prices. Excluding own shocks, fluctuations in output are mostly accounted for by monetary aggregate. M2 accounts for 7% of the variations in output after a year and 27% after five years. Notice that the contribution of interest rate to the variance of M2 represents 20% after four years, which corroborates the previous results of impulse response functions highlighting a significant influence of interest rate on M2. Thus, the quantitative channel is effective in the Moroccan case. This suggests that the money still plays an important role in the monetary policy strategy.

Regarding the other transmission channels, bank credit explains a dominant part of the variance of output relatively to other channels. After three and a half years, 18% of variations in output result from credit shocks. In the same vein, the growing contribution (changed from 1% at year one to 35% after three and a half years) of interest rate to fluctuations in bank credit corroborates the relative importance of the bank lending channel.

[11] Here we report only the variance decomposition of output and consumer prices and other results are available with authors upon request.

Subsequently, the interest rate explains 12% of variance of output after two years. This result supports the significant and transitory impact of monetary policy on output as highlighted by the impulse response functions. The asset prices and exchange rate channels are weak. The proportion of output variations attributable to the shock to these variables is 4% after twenty-six months for MASI and after forty-nine months, for the exchange rate. Consequently, the ineffectiveness of the exchange rate and asset prices channels in transmitting monetary policy shocks as showed by the impulse response analysis. These findings are not surprising in the context of the fixed exchange rate and the limited role of the stock market in financing the Moroccan economy. Indeed, the exchange rate and MASI are not major sources of national output fluctuations.

Regarding the variance decomposition of prices, the monetary aggregate shocks accounts for 23% of the fluctuations in consumer prices after five years, implying that shocks in monetary aggregate are an important source of inflation in Morocco. The interest rate also plays an active role in explaining the fluctuations in prices since it accounts for 19% after four years, involving the effectiveness of the interest rate channel as shown by impulse response analysis. Likewise, a non-negligible part of variance in prices is sourced from a shock on exchange rate which amount to 14% after one and a half years, indicating a significant exchange rate pass-through. The Moroccan monetary authorities should take into account this result at the time of the liberalization of exchange rate due to its significant effect on prices stability, defined as a primary goal of BAM. At last, the contribution of shocks to asset prices and bank credit are limited. While the asset prices shock explains 7% the variations in prices, the credit to private sector accounts for only 4% after twenty-six months.

**Table 1:** Variance decomposition of output and prices

| **Variance decomposition of IPI** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Horizon | IPI | IPC | M2 | CBP | NEER | TB6 | MASI |
| 2 | 0.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 0.86 | 0.03 | 0.03 | 0.03 | 0.00 | 0.04 | 0.01 |
| 12 | 0.72 | 0.06 | 0.07 | 0.03 | 0.01 | 0.08 | 0.03 |
| 18 | 0.55 | 0.05 | 0.13 | 0.12 | 0.01 | 0.11 | 0.02 |
| 24 | 0.43 | 0.04 | 0.18 | 0.17 | 0.02 | 0.12 | 0.03 |
| 30 | 0.40 | 0.04 | 0.21 | 0.17 | 0.03 | 0.11 | 0.04 |
| 36 | 0.38 | 0.04 | 0.24 | 0.17 | 0.03 | 0.11 | 0.04 |
| 42 | 0.36 | 0.04 | 0.25 | 0.18 | 0.03 | 0.11 | 0.04 |
| 48 | 0.35 | 0.04 | 0.26 | 0.18 | 0.03 | 0.10 | 0.04 |
| 54 | 0.35 | 0.04 | 0.27 | 0.17 | 0.04 | 0.10 | 0.04 |
| 60 | 0.34 | 0.04 | 0.27 | 0.17 | 0.04 | 0.10 | 0.04 |
| **Variance decomposition of IPC** | | | | | | | |
| Horizon | IPI | IPC | M2 | CBP | NEER | TB6 | MASI |
| 2 | 0.02 | 0.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 0.01 | 0.83 | 0.01 | 0.00 | 0.13 | 0.01 | 0.01 |
| 12 | 0.03 | 0.66 | 0.04 | 0.03 | 0.15 | 0.05 | 0.04 |
| 18 | 0.03 | 0.53 | 0.09 | 0.03 | 0.14 | 0.12 | 0.07 |
| 24 | 0.03 | 0.45 | 0.14 | 0.03 | 0.14 | 0.15 | 0.06 |
| 30 | 0.03 | 0.41 | 0.16 | 0.04 | 0.13 | 0.17 | 0.06 |
| 36 | 0.03 | 0.39 | 0.18 | 0.04 | 0.13 | 0.18 | 0.06 |
| 42 | 0.04 | 0.37 | 0.19 | 0.04 | 0.12 | 0.18 | 0.05 |
| 48 | 0.04 | 0.36 | 0.20 | 0.04 | 0.12 | 0.19 | 0.05 |
| 54 | 0.04 | 0.35 | 0.22 | 0.05 | 0.11 | 0.19 | 0.05 |
| 60 | 0.04 | 0.34 | 0.23 | 0.05 | 0.11 | 0.18 | 0.05 |

## 5. Summary and Conclusions

While the monetary transmission mechanisms have been widely studied in developed countries, such studies in developing countries like Morocco are scarce. As for the majority of the empirical works on the transmission channels, we estimate an SVAR model to investigate four transmission channels of monetary policy, with an economic interpretation to each of the structural shocks. The presence of external constraints on monetary policy in developing countries necessitates a model specification, unlike that of developed economies. The model includes two vectors of variables. The first one contains the endogenous domestic variables while the second encompass the exogenous foreign variables. We imposed restrictions on contemporaneous effect of the endogenous variables. The results of SVAR analysis show that an unexpected monetary policy shock produces a transitory decrease in output and a persistent decline in prices. Moreover, when the decrease of output is immediately significant, the response of prices become significant after ten months. The study also illustrates that the monetary aggregate contains important additional information in the transmission process of monetary policy shocks in Morocco. Excluding own shocks, fluctuations in output and consumer prices are largely attributed to M2.

Furthermore, evidence from impulse responses and variance decomposition suggests that the credit channel and interest rate channel[12] play an important role in transmitting the monetary policy effect to the real sector. These results are natural, given that the banks are the major source of external funding for Moroccan economy and due to market-oriented monetary policy instruments and operating procedures during the past two decades. The two channels impact the real sector differently. While the credit channel is important for the economic growth, the interest rate channel is crucial for managing inflation.

Concerning the financial asset prices channel and the exchange rate channel, empirical estimates show that they are not important in transmitting monetary policy shock. These results are not surprising because, on the one hand, the Moroccan capital market is narrow and not sufficiently developed and on the other hand, of the fixed the exchange rate. These two channels could play a more active role in the transmission process owing to the growing flexibility in the exchange rate and the substantial efforts undertaken in order to render Casablanca the first financial city in the North Africa.

The analysis provides some policy implications. First, it is important to take into account the effect of externals

[12] This is in line with Bank Al-Maghrib's decision to set interest rate as operational target replacing monetary aggregate.

shocks on monetary policy when analyzing the transmission mechanisms in Morocco. Considering the external constraints on monetary policy and controlling for international shocks allows one to better appreciate the effect and the functioning of the transmission channels. Second, since Moroccan authorities prepare its transition to an inflation targeting strategy, the functioning of the interest rate channel is a good argument. However, additional efforts are needed in order to develop a more resilient, competitive and dynamic financial system, to further diversify the financing alternatives for the private sector, and to establish more flexible exchange rate. This can enhance the functioning of the four channels studied and reduce the dependence of the national economy on the bank's credit. Naturally, these transformations should be accompanied by a dynamic monetary policy formulation. Third, given the fact that the bank credit is a strong transmission channel and a major source of external financing for the Moroccan economy, it is crucial to ensure the health and stability of the banking system which is a pre-condition towards economic stability. Finally, the stickiness of bank credit in reaction to monetary policy shocks involves anticipating credit movements one year in advances in order to avoid the risk that is likely to alter BAM's primary goal.



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## Appendices

**Appendix 1**

**A1: Results of ADF, PP and KPSS tests**

| Tests / Variables | ADF | PP | KPSS | Integration order |
|---|---|---|---|---|
| IPI | -2.317869 (ct) (7) | -1.996310 (ct) (3) | 0.311148 (ct) (11) | I(1) |
| ΔIPI | -4.979322 (c) (6)* | -6.397965 (c) (10)* | 0.065415 (c) (3)* | |
| IPC | -2.956522 (ct) (2) | -2.717001 (ct) (12) | 0.408268 (ct) (11) | I(1) |
| ΔIPC | -12.38944 (c) (1)* | -13.64425 (c) (12)* | 0.158341 (ct) (9)* | |
| M2 | 11.30469 (1) | 1.027522 (c) (4) | 0.444285 (ct) (12) | I(1) |
| ΔM2 | -18.5425 (c) (0)* | -14.64197 (4)* | 0.305802 (c) (3)* | |
| CBP | -2.04528 (ct) (5) | 8.44809 (10) | 0.222379 (ct) (11) | I(1) |
| ΔCBP | -3.38902 (c) (4)* | -14.79670 (c) (9)* | 0.292644 (c) (10)* | |
| NEER | -1.60585 (c) (1) | -1.736139 (c) (0) | 0.407334 (ct) (12) | I(1) |
| ΔNEER | -17.26841 (0)* | -17.30158 (4)* | 0.179276 (c) (0)* | |
| TB6 | -2.19832 (ct) (3) | -0.59605 (c) (7) | 0.259344 (ct) (8) | I(1) |
| Δ TB6 | -6.42055 (2)* | -15.77434 (c) (7)* | 0.126372 (c) (8)* | |
| MASI | -1.60184 (c) (1) | -1.447744 (c) (8) | 0.293623 (ct) (8) | I(1) |
| ΔMASI | -12.94319 (c) (0)* | -13.70572 (c) (7)* | 0.190549 (c) (8)* | |
| IPI* | -2.679047 (ct) (3) | 0.809312 (10) | 0.229790 (ct) (12) | I(1) |
| ΔIPI* | -5.290999 (2)* | -17.02066 (9)* | 0.074807 (c) (10)* | |
| I | -2.083210(1)** | -1.929100(9)***(10%) | 0.266701 (ct) (12) | I(1) |
| Δi* | -8.960171 (0)* | -9.298343 (7)* | 0.083756 (c) (9)* | |

Δ is the first difference operator, numbers in parentheses indicate the optimal lag, *(ct)* denote the model with constant and trend, (c) represents the model with only a constant and otherwise the model is without constant and trend.
*,**, *** Stand for stationarity of the variable respectively at the 1%, 5% and 10% significance level.

**Appendix 2**

**A2: The Saikkonen and Lütkepohl (2000) cointegration test**

| r0 | LR | Pval | 90% | 95% | 99% |
|---|---|---|---|---|---|
| 0 | 162.19 | 0.0000 | 106.73 | 111.65 | 121.28 |
| 1 | 115.99 | 0.0000 | 79.51 | 83.80 | 92.26 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 67.55 | 0.0093 | 56.28 | 59.95 | 67.24 |
| 3* | 36.02 | 0.1240 | 37.04 | 40.07 | 46.20 |
| 4 | 16.50 | 0.3506 | 21.76 | 24.16 | 29.11 |
| 5 | 6.81 | 0.3494 | 10.47 | 12.26 | 16.10 |
| 6 | 0.16 | 0.7514 | 2.98 | 4.13 | 6.93 |

The critical values are tabulated by Lütkepohl and Saikkonen (2000)

**Appendix 3**

**A3: Diagnostic tests of the residuals**

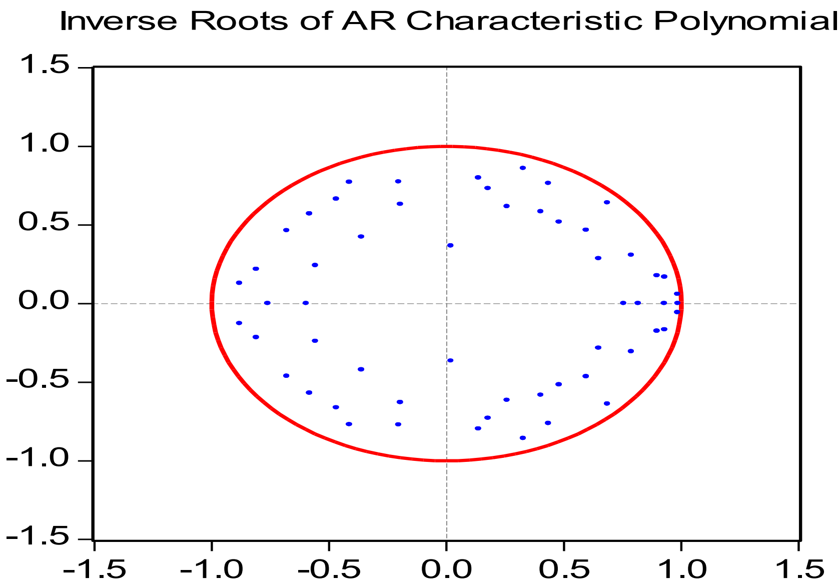
| **Tests LM and MARCH-LM** | | | | |
|---|---|---|---|---|
| Tests | $LM_1$ | $LM_7$ | $LM_8$ | MARCH-LM(7) |
| Test statistic | 101.4724 | 73.45941 | 56.30962 | 5497.7798 |
| p-value | 0.0000 | 0.0134 | 0.2203 | 0.4603 |

| **The Ljung-Box and the normality Jarque Bera tests** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $u_1$ | $u_2$ | $u_3$ | $u_4$ | $u_5$ | $u_6$ | $u_7$ |
| LB(8) | 23.619 | 5.1548 | 2.3446 | 1.4009 | 1.0814 | 2.5110 | 2.0457 |
| Probability | 0.003 | 0.741 | 0.969 | 0.994 | 0.998 | 0.961 | 0.980 |
| JB | 5.602518 | 10.29030* | 70.11933* | 17116.69* | 185.5792* | 3.793546 | 13.91475* |

* denote a rejection of the normality hypothesis at 5% significance level. The numbers in parentheses indicate the order of autocorrelation.

**Appendix 4**

**A4: Roots of Characteristic Polynomial**



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# The Nexus Between Research And Development And Export Decision: The Case Of Turkey

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# The Nexus Between Research and Development and Export Decision: The Case of Turkey

**ESRA BALLI**[1] **ÇİLER SİGEZE**[2]

[1] Çukurova University, FEAS, Department of Economics, Adana, Turkey
[2] Çukurova University, FEAS, Department of Econometrics, Adana, Turkey

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ABSTRACT

**Purpose**
The purpose of this paper is to present an investigation into the relationships between Research and Development (R&D) and export decisions in Turkey. We empirically test to what extent firms' R&D and export decisions are determined on the basis of firm-specific characteristics such as labour productivity, total sales, age, skill, capital intensity, foreign ownership and transfer of technology.
**Design/methodology/approach:**
Data used in this study was extracted from the World Bank's Turkey-Enterprise Survey conducted in 2013 and 2014 in a cross-section study undertaken in face-to-face interviews with the establishments. Bivariate Probit estimation is utilized.
**Findings:**
Our main findings show that learning by examining the export effect is invalid for Turkey. Additionally, as expected, government support and the transfer of technology increases the probability of a decision to export. Furthermore, both export and R&D decisions exhibits substantial differences on the basis of firm characteristics.
**Research limitations/implications**:
Our principle findings lead to the implication that Turkish government support for small firms can particularly be employed as a mechanism to cope against the obstacles posing limitations on small firms to make a decision to export.
**Originality/value**:
The novelty of this study is that it uses data extracted from one of the most recent and reliable surveys conducted by the World Bank on the behaviour of firms in Turkey.



## 1. Introduction

The relationship between Research and Development (R&D) and the decision to export has been of great interest in firm-level studies. An increase in a firm's R&D expenditure is regarded as one of the main strategies to deal with competition stemming from globalization. Theoretical and empirical studies show a positive relationship between a firms R&D ability and export capability. Most existing studies on export-oriented growth agree that an export-oriented policy is a successful strategy for developing economies, as it leads to higher output growth and allows exporters to learn advanced foreign technologies. Accordingly, access to advanced foreign technologies in international markets encourages exporters to learn advanced knowledge, resulting in higher productivity. In particularly, Cohen and Levinthal (1989) argue that investment in R&D has outcomes in two directions: The first one is to direct productivity gains through innovation, and the second one is learning by exporting. Substantially, there are two hypotheses outlined regarding productivity of exporting firms: The first is the self-selection hypothesis that asserts that only the most productive firms are more likely to enter into export markets, since engaging in foreign trade implies greater costs related to operating in those foreign countries. Secondly, the learning by exporting hypothesis affirms that exporting firms can have access to their trade partners and competitors' information sets, engendering a further productivity gain for the exporting firm. This study aims to investigate the extent that the patterns observed in the behaviour of Turkish firms are in line with

†Corresponding Author: ESRA BALLI
E : sraballi@cu.edu.tr
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the discussions in literature, using a dataset obtained from the World Bank's recent micro-level survey on Turkish firms. Our main motivation stems from the fact that a limited number of studies were undertaken on this in Turkey despite the fact that the issue poses important policy implications. In particular, we place a special emphasis on the relationship between R&D and export decisions in Turkey, as well as on the presence of self-selection and learning by the export hypothesis. This article is arranged as follows; the following section presents a literature review on the relationship between exports and R&D decisions. The third section briefly details developments in export and R&D expenditure in Turkey. The data and variables are presented in section four. We present the empirical strategy and empirical results in the fifth and sixth sections respectively. The conclusions are presented in the seventh section.

## 2. Literature Review

Most empirical studies have agreed that R&D plays a crucial role in a firm's export decision and its productivity. Yasar and Rejesus (2005) applied the Propensity Score Matching technique and Difference-In-Difference estimators to shed light upon the validity of self-selection and learning by exporting for Turkey during the period of 1990-1996. They found the symptoms of learning by exporting in Turkey. In a further study, Maggioni (2012) examines the relationship between exports and productivity for Turkey depending on Yasar ve Rejesus (2005)'s methodology for the period of 1990-2001. The author finds evidence in favour of both self-selection hypothesis and learning by exporting. Aldan and Gunay (2008) find that while larger and more productive firms self-select into export market, exporting increases labour productivity and employment for Turkey. Aw and Hwang (1995) point out that there are significant differences in productivity levels between exporters and non-exporters in their study. Hall and Mairesse (1995) report that a sustained R&D expenditure causes productivity gains. Crépon et al. (1998) also concludes that there is a positive correlation between productivity and R&D. Srithanpong (2016) finds that Thai firms' decision to participate in R&D activities is positively affected by their government's support. Golovko and Valentini (2011) find that firms that invest in innovation are considerably more likely to export. Van Beveren and Vandenbussche (2010) report that firms self-select R&D activities to enter into the export market. Ito and Pucik (1993) indicate that firms' export ratio is not related the firms' R&D activities. Bravo-Ortega et al. (2014) find that firms in Chile engaging in R&D activities have a higher tendency to export. R&D expenditure and related export decisions are not always an easy choice for firms. Wakelin (1998) argues that smaller firms may not opt for allocating resources to R&D and entering the export markets because of sinking costs risk and cost of searching out new markets. Yang and Chen (2012) find that R&D has a significant impact on both productivity and exports.* In particular, Özler, Taymaz and Yilmaz (2009) present evidence that Turkish firms are highly constrained by these costs of entry to export markets. Basile (2001) tests the relationship between innovation and export behaviour of Italian manufacturing firms using the Tobit model. In the study, export behaviour is used as a probability of a firm to export and as the propensity to export for the exporting firms. The results indicate that innovation activities measured by R&D expenditure are important and make an explanation of heterogeneity in export behaviour of Italian firms.

Griffith et al. (2006) investigate the importance of innovation in productivity using R&D expenditure, innovation output, and productivity for four European countries and found that the level of innovation activities determines productivity level. Bernard and Jensen (1999) find that firms with higher productivity are inclined to export and that plant size is positively associated with the decision to export, despite the gains of exporting for the firms being ambiguous in terms of productivity and wage -growth. Aw et al. (2007) find that firm productivity leads to export decision and there is an evidence of a positive, statistically significant and robust relationship between export participation and future productivity. Girma et al. (2008) examine the two-way relationship between R&D and export activity using a Bivariate Probit estimation technique for firm level databases for Great Britain and the Republic of Ireland. They find that previous exporting experience increase the innovative capability of Irish firms. Caldera (2010) analyses the relationship between innovation and the export behaviour of firms applying random effects of the probit model using firm-level survey data for the period 1990–2002 for Spanish firms over the period 1991–2002. R&D intensity is used as one of the innovation inputs in this study. The empirical results show that innovation has a positive effect on the export decision.

Aw et al. (2011) undertook an analysis, using a dynamic structural model, of a producer's decision to invest in R&D and export for the Taiwanese electronics industry for the period of 2000-2004. The results show that export decisions and invest in R&D or technology are inter-correlated and affect future profitability. Braymen et al. (2011) test the factors that affect new firms exporting within the first four years of operation, for the period of 2004-2007 in the United States, utilizing Bivariate Probit model. The results show that there is a positive relationship between a new firm's R&D decision and its export decision. Yang and Chen (2012) investigate the relation between productivity and exports and in addition, the determinants of R&D activity in Indonesian manufacturing firms, and find that R&D has a significant impact on both productivity and exports. Esteve-Pérez and Rodríguez (2013) investigate exports and R&D using Bivariate Probit model for small and medium-sized enterprises in Spanish manufacturing for, the period of 1990–2006. The results show a clear interdependence between export and R&D activities. Lööf et al. (2015) test

* For more discussion on exporting, and productivity see Wagner (2007) and the references cited therein.

joint effect of exports, innovation and external knowledge on total factor productivity growth for Swedish manufacturing firms and find that persistent innovators and persistent exporters can achieve higher productivity growth through learning, by exporting relative to temporary innovators and exporters.

Becker and Egger (2013) find that firms that innovate are more likely to engage in export activities than firms that do not innovate. Damijan et al. (2008) provided no evidence for the hypothesis that innovation increases the chance of becoming a first-time exporter. Çetin and Cincera (2015) find that firms engaging in R&D activities and firms' exports decisions are correlated for EU countries. Neves et al. (2016) assert that export activities lead to an increase in R&D investment in Portugal. Lechevalier and Ito (2010) find that firms investing in R&D and export tend to maintain R&D or export.

This paper focuses on two types of relationships depicted in the literature. In the first place, we attempt to investigate how the firms' export decision and R&D decision are determined based on the firm's specific characteristics, including, total sales, foreign ownership of the company, government support, labour productivity, age, skill, capital intensity. Secondly, we take into account the interaction between export and R&D decisions for Turkish manufacturing firms. Therefore, examining the factors determining R&D decision for companies informs well-targeted government policies.

## 3. Developments in export and R&D expenditure in Turkey

Starting from the 1980s, replacing the import-substituting strategy, Turkey has implemented an export-led growth policy, raising the importance of the interaction among export, research and development (R&D) expenditures, and ultimately, the country's economic growth. Table 1 shows exports and R&D expenditures in Turkey between 1996 and 2013.

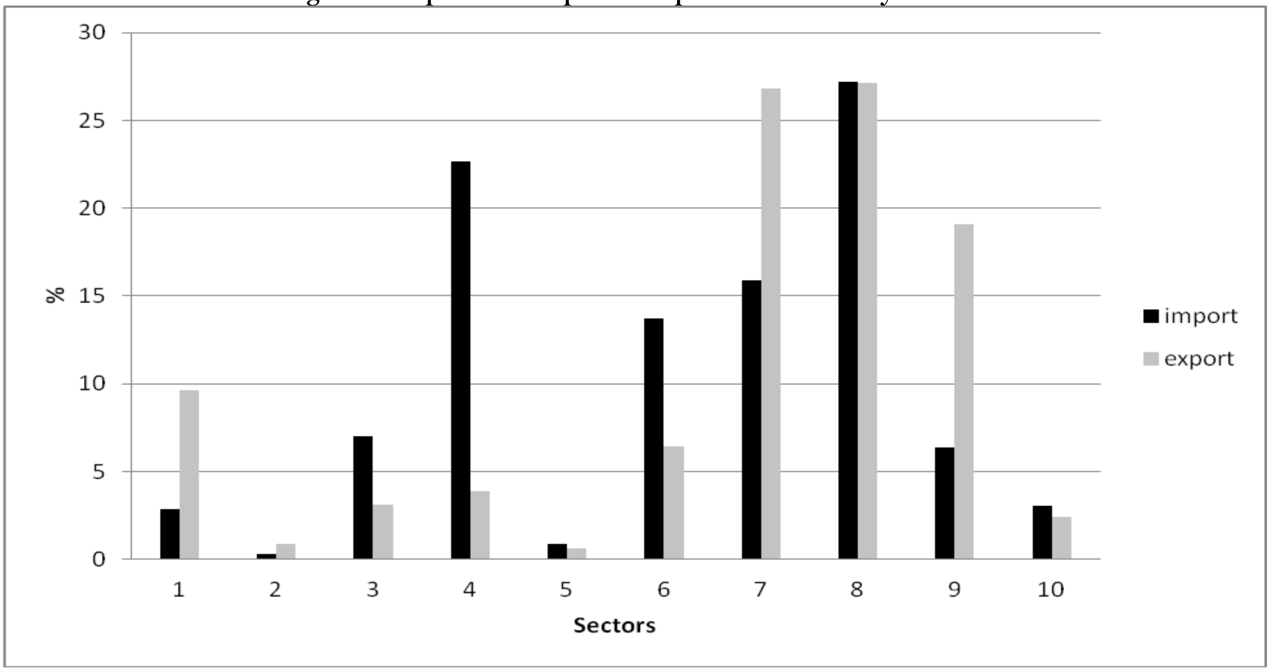
**Table 1: Turkish exports and R&D expenditures during 1996-2013**

| Year | Exports (% of GDP) | Exports (current million US$) | R&D (% of GDP) | Patent applications, residents |
|---|---|---|---|---|
| 1996 | 21,54 | 39094,66 | 0,45 | 189 |
| 1997 | 24,58 | 46664,62 | 0,49 | 203 |
| 1998 | 21,34 | 57459,51 | 0,37 | 207 |
| 1999 | 19,44 | 48551,40 | 0,47 | 276 |
| 2000 | 20,10 | 53574,40 | 0,48 | 277 |
| 2001 | 27,44 | 53785,58 | 0,54 | 337 |
| 2002 | 25,22 | 58638,96 | 0,53 | 414 |
| 2003 | 22,99 | 69674,96 | 0,48 | 489 |
| 2004 | 23,55 | 92361,27 | 0,52 | 682 |
| 2005 | 21,86 | 105557,06 | 0,59 | 928 |
| 2006 | 22,67 | 120354,56 | 0,58 | 1072 |
| 2007 | 22,32 | 144466,00 | 0,72 | 1810 |
| 2008 | 23,91 | 174608,49 | 0,73 | 2221 |
| 2009 | 23,32 | 143292,03 | 0,85 | 2555 |
| 2010 | 21,21 | 155074,47 | 0,84 | 3180 |
| 2011 | 23,98 | 185760,02 | 0,86 | 3885 |
| 2012 | 26,30 | 207440,37 | 0,92 | 4434 |
| 2013 | 25,65 | 210846,32 | 0,94 | 4392 |

Source: World Development Indicators

It can be argued that import-led growth policy is determinedly implemented in Turkey. Turkish exports increased during the last two decades except during 2008-2009 global financial crises. The momentum loss suffered during the 2008-2009 financial crisis was quickly overcome in 2011 for a steady increase in exports. Turkey exhibits quite poor performance in terms of R&D share in GDP and patent applications by % of population, relative to OECD countries, although it does shows signs of gaining momentum in the last number of years.

**Figure 1. Import and Export Composition of Turkey in 2014**




Source: TURKSTAT, 2014

The corresponding sectors in Figure 1 respectively are (1) food and live animals; (2) beverages and tobacco; (3) crude materials, inedible, except fuels; (4) mineral fuels, lubricants and related materials; (5) animal and vegetable oils, fats and waxes; (6) chemicals and related products; (7) manufactured goods classified chiefly by material; (8) machinery and transport equipment; (9) miscellaneous manufactured articles and (10) commodities and transactions not classified elsewhere in the SITC. According to the Figure 1 Turkey has net exports in food and livestock and manufactured goods classified chiefly by material, whereas a high dependency on imports exists in mineral fuels, lubricants and related materials, chemicals and related products and crude materials. Needless to say, the Turkish economy depends heavily on imports of natural resources to manufacture not only domestic goods, but also exports goods, rendering Turkey vulnerable to external shocks such as increases in oil and natural gas price, and, at the end of the day, weakening Turkish exporters' competitiveness. Besides, machinery and transport equipment sector gives an important clue about import-export nexus in Turkey, as it exhibits a dramatic dependence on imported intermediate goods. Inancli and Konak (2011) show that the Turkish automotive industry and its sub-sectors have external dependency on export.

## 4. Data and Variables

The data used in this study is extracted from the World Bank's Turkey-Enterprise Survey conducted in 2013 and 2014, arising from a cross-section study done through face-to-face interviews with the establishments. In this survey, the total number of selected samples, based on industry, establishment size and region stratification, is 1344. However, after omitting observations with missing and outlier responses on the variables involved in the empirical model, we end up with a sample size of 694. The advantage of the data used in this study lies in that it constitutes the most recent sample set available, reflecting the behaviours of firms from different dimensions such as industry, establishment size and regions in Turkey. In addition, this data gives information on export and R&D activities of firms and other firm characteristics.

Following Yang and Chen (2012), we proxy the characteristic of the firms in terms of international ties by a dummy variable structured to indicate a given firm's foreign ownership (MNC). In this point, it should be noted that empirical studies on the effect of foreign ownership on firm's R&D decisions show conflicting and ambiguous results. Lall (1983), for example, found that foreign ownership is a catalyst for a firm to initiate higher R&D activity. On the contrary, Lundin et al. (2007) showed that domestic firms are more inclined to spend more on R&D. In addition to foreign ownership variable, we include capital intensity in our empirical specification. To this end, as suggested by Yang and Chen (2012), capital intensity variable is calculated by the authors as total sales per employee. Last but not least, following Özler, Taymaz and Yilmaz (2009), we include variable transfer of technology from overseas through know-how and license agreements as a proxy for a firm's technology transfer. Table 2 presents descriptive statistics and definitions of the variables.

**Table 2. Variable definitions and summary statistics**

| Variable | Definitions | mean | Std. Dev. |
|---|---|---|---|
| R&D | Dummy R&D: Dummy variable equals 1 if firm has performed export | 0.063 | 0.243 |
| EXPORT | Dummy Export: Dummy variable equals 1 if firm has performed export | 0.546 | 0.498 |
| lnkl | Capital intensity: total sales per employee | 4.840 | 0.836 |
| dtech | Dummy Technology Transfer: Dummy variable equals 1 if firm has performed transfer of technology. | 0.272 | 0.016 |
| sales | Total sales of the firm | 119 | 384 |
| skill | Ratio of university graduates to total employees | 10.5 | 14.713 |
| mnc | Firm's Foreign ownership | 0.051 | 0.221 |
| lpr | Labour productivity: as a ratio of total sales to working hours | 14436.49 | 237686.4 |
| govsup | If the firm has received any supports from the national, regional or local governments or European Union sources within last three years | 0.110 | 0.314 |
| age | Age of the firm | 19 | 13 |

**5. Empirical Strategy**

In this paper, we investigate the possible relationship between export decision and R&D decision in Turkey. Given that both export decision and R&D decision are correlated and interdependent, the error terms of these equations are highly likely to be correlated. To handle this, we simultaneously model export and R&D decisions, utilizing a recursive Bivariate Probit model. Bivariate Probit estimates a maximum likelihood of two-equation probit models in obtaining parameters of the two simultaneous equations. On the other hand, in the recursive Bivariate Probit model, the endogenous variable R&D appears on the right-hand side of the first equation for export (Greene, 2003, s. 715). Following Aw et al. (2007), Girma et al. (2007) and Aristei et al. (2013) the empirical model takes the following form;

$$EXPORT_i = \begin{cases} 1 & if \quad EXPORT_i^* > 0 \\ 0 & if \quad EXPORT_i^* < 0 \end{cases}$$

$$R\&D_i = \begin{cases} 1 & if \quad R\&D_i^* > 0 \\ 0 & if \quad R\&D_i^* < 0 \end{cases}$$

$$\begin{cases} EXPORT = \gamma_0 + \gamma_1 R\&D + \gamma_2 dtech + \gamma_3 skill + \gamma_4 \ln age + \gamma_5 govsup + \gamma_6 lpr + \gamma_7 \ln sales \\ R\&D = \alpha_0 + \alpha_1 dtech + \alpha_2 \ln kl + \alpha_3 skill + \alpha_4 \ln age + \alpha_5 mnc + \alpha_6 govsup + \alpha_7 \ln sales \end{cases}$$

This strategy allows the correlation between the two dependent variables and the error terms with N (0, 1) nature. Here $\rho$ denotes the covariance of the error terms in two simultaneous equations, taking the value of 0 if two decisions in the equations are taken separately. Hence $\rho$ is defined as follows:

$$\begin{pmatrix} \varepsilon_{1i} \\ \varepsilon_{2,} \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right]$$

**6. Empirical Results**

Table 3 presents recursive Bivariate Probit regressions results. In this setting, we simultaneously estimate the determinants of the R&D and export decisions. The results show that there is no evidence of the presence of learning by exporting effect. Additionally, we can state that transfer of technology (dtech), and skill variables are positively associated with both export and R&D decisions. Furthermore, we cannot reject the null hypothesis that capital intensity (lnkl) has no impact on R&D decision. Besides, firms' age (lnage) and the total sales (lnsales) are positively and significantly associated with export decision. This finding implies that younger firms are more inclined to initiate with export activities. On the other hand, given the data set and econometric techniques applied, there is evidence that Turkish government-support plays a stimulating role in both export and R&D decisions.

Considering the determinants of export decision of Turkish firms, our estimates indicate that government support increases export decision. In addition, skill measured as a ratio of university graduates to total employees and firm age have significantly positive effects on export decision. These findings show that the more experienced firm, in terms of year of establishment tend to export decision more relative to younger firms. Lastly, firms employing university graduates are more likely to engage in export decision. This may stem from the fact that exporting human capital is an important factor in reacting to international markets.

**Table 3: Bivariate Probit Regressions Results**

| | R&D Decision | Export Decision |
|---|---|---|
| Constant | -2.972*** | -2.591*** |
| | (0.597) | (0.356) |
| R&D | | -1.996*** |
| | | (0.279) |
| lnkl | 0.156 | |
| | (0.152) | |
| skill | 0.016*** | 0.012*** |
| | (0.004) | (0.003) |
| lnage | 0.065 | 0.547*** |
| | (0.240) | (0.155) |
| mnc | -0.012* | |
| | (0.007) | |
| govsup | 0.413** | 0.587*** |
| | (0.203) | (0.173) |
| lpr | | 0.00002 |
| | | (0.00002) |
| lnsales | 0.036 | 0.299*** |
| | (0.129) | (0.052) |
| dtech | 0.349** | 0.244** |
| | (0.159) | (0.114) |
| Wald chi2 | 185.97*** | |
| $\rho$ | 0.916** | |
| Number of observations | 694 | |

Figures in the parentheses are standard deviations, ***, ** and * denote coefficient are significant at 1%,5%, and 10% statistical levels, respectively.

## 7. Conclusion

In this work, we investigated the relationship between R&D decision and exporting activity by using data from the World Bank's Turkey-Enterprise Survey conducted in 2013 and 2014 in a cross-section study done through face-to-face interviews with the establishments, using Bivariate Probit estimation approach. In particular, we focus on the relationship between R&D and export decisions. Given the data set and econometric techniques applied, the empirical results show that the learning by export effect is invalid for Turkey. Overall, Turkey lacks one of the most important pillars of international trade, learning by exporting, given the present structure and empirical results. This implies that fundamental transformation is needed to tackle the barriers limiting the potential of learning by exporting. In this sense, the importance of R&D must be understood by the government and firms to increase and sustain the benefits of international trade. Besides government subsidies and transfer of technology increases the probability of a firm's export decision, as expected. In other words, government support encourages firms to participate into export and R&D decision. Accordingly, this finding signals that government support for small firms can particularly be employed as a mechanism to cope against the obstacles posing limitations on small Turkish firms to take export decisions. Our findings are in agreement with that of Esteve-Pérez et al. (2013) arguing that the interrelation between R&D and export should be considered by policy makers.



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# What do we really know about the Transatlantic Trade and Investment Partnership: facts versus myths? Trying to understand social expectations

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# What do we really know about the Transatlantic Trade and Investment Partnership: facts versus myths? Trying to Understand Social Expectations

Joanna Dzialo[1], Bogna Gawronska-Nowak[1], Ziemowit Stanczyk[2]

[1]*Lazarski University, Department of Economics, Warsaw, Poland*
[2]*Institute for Socio-Economic Enquiries, Warsaw, Poland*

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ABSTRACT
**Purpose**
The purpose of this work is to confront the social expectations of the TTIP, and how it effects the so-called "expert knowledge". Defining a mismatch between the social expectations and expert knowledge may contribute to better understanding of the controversies related to the TTIP. Using the NAFTA case study, we investigate if there is a significant gap between ex-ante and ex-post analysis of the Free Trade Agreement (FTA).
**Design/methodology/approach:**
We rely on Eurobarometer (2014, 2015) and Bertelsmann Foundation (2016) surveys to describe the TTIP-related social expectations. We make a critical overview of the global CGE models, which are the main source of ex-ante estimations of TTIP macro effects. We also use the NAFTA case study as a TTIP reference point that allows for a comparison of ex-ante with ex-post analysis results.
**Findings:**
Social expectations regarding the economic effects of the TTIP are ambiguous on both sides of the Atlantic. The CGE models have many limiting assumptions. They are, however, a useful tool for exploring the effects of the TTIP, bearing in mind all restrictions and limitations of ex-ante analyses. The NAFTA case study indicates that most ex-ante models tend to overestimate benefits and underestimate disadvantages arising from free trade.
**Research limitations/implications**: Many such surveys have been conducted recently. The results should be developed upon, for a more detailed, country-specific and time variant understanding of possible sources of social conflicts in the context of the TTIP (or FTA) implementation.
**Originality/value**:
The analysis tends to prove the existence of a mismatch between social and expert knowledge on the TTIP, which may result in generating social conflicts. A practical and original outcome of our work is a well-supported recommendation to make the TTIP realistic effects much more transparent to the public, which should be important to those supporting the TTIP (and generally speaking FTA).



## 1. Introduction

In July 2013, the European Union began negotiations with the United States on the conclusion of the agreement on the Transatlantic Trade and Investment Partnership (TTIP). One of the important reasons for opening the negotiations on what constitutes the largest trade agreement in the world is the desire to counter the effects of the 2008 financial crisis, which caused a sharp drop in turnover between the EU and the US, a decline from which we are only now recovering. The share of the European Union in global turnover of goods decreased from 38.6% in 2007 to 32.2% in 2014, and the share of the United States from 11.2% to 10.7% at the same time. China's share was increasing during this period from 7.7% to 11.4%. The growing importance of the so-called emerging economies (e.g.: the BRICS countries) also presents significant competition to the EU and the US; the total GDP of the BRICS countries (in current prices) was predicted to be greater than that of the US at the end of 2016 and also in 2017 (The UNCTAD database, 2015). Therefore, it is increasingly difficult for the US and the EU to maintain a dominant position in the global economy without a deeper integration of both areas and

†Corresponding Author: Joanna Dzialo
E : jdzialo@uni.lodz.pl
*DOI:* 10.25103/ijbesar.111.06

the strengthening of their competitive position. Finally, developing common standards to facilitate the launching of goods onto the market is an equally important argument for the introduction of TTIP. In the era of global economic ties, companies need guarantees that they can rely on widely recognized rules while conducting business activity worldwide. The TTIP gives hope that the common standards of the EU and the US will be replicated in other parts of the world, and not vice versa.

However, since the beginning of the negotiation process, the TTIP raises strong, often negative, social emotions, both in the EU and in the US. European opponents indicate, for example, a threat to EU agriculture, as the TTIP will significantly increase the amount of duty-free meat imports and will abolish duties on wheat. In addition, opponents claim that this agreement may result in flooding Europe with cheap, inferior quality food, as the European and American standards in terms of livestock rearing and crop cultivation vary significantly. Opponents are therefore concerned that this harmonization will mean lower quality standards, since manufacturers will seek to decrease production costs. Additionally, local and regional authorities will, for the first time, be subject to the regulations of local public procurement contracts, making it more difficult for them to support local businesses and local economic development. It is believed that this will significantly reduce the ability of local and regional authorities in the EU and the US to use public spending to achieve major social objectives, such as creating new jobs. Furthermore, opposition, especially in Europe, is raised by the mechanism of Investor-to-State Dispute Settlement (ISDS), which gives private investors within the framework of international law the power to use the dispute settlement procedure in cases against foreign authorities. This mechanism essentially grants corporations the status equal to that of governments, allowing them to influence/deviate public policy. Taking into account the above, the evaluation of the expected effects of TTIP from the *ex-ante* perspective is an extremely difficult and challenging task. At the same time, however, it is a key one in order to objectify the balance of possible benefits and losses.

The aim of this paper is to review and undertake a critical analysis of the existing studies on the expected effects of TTIP on different economies, primarily those of the European countries participating in the agreement. We discuss the results obtained in the global CGE models, as well referring to actual international surveys on social expectations arising from the TTIP. In addition, we explore the NAFTA case; the treaty between the US, Canada and Mexico that has been in force for 22 years. It seems that the comparison of the estimated effects of NAFTA (the *ex-ante* analysis) with the recognized effects (the *ex post* analysis) of its functioning can provide a valuable analogy for analyses of the TTIP. Our leading motive in these critical overviews is to confront the possible reality with the social perception, and in this way, to define some borderlines between “facts” and “myths”.

## 2. Social Expectations Concerning Macro-Effects of TTIP

The objective assessment of social expectations of the TTIP on both sides of the Atlantic seems to be quite a difficult task. It is even more difficult to clearly determine what these expectations are like with regard to specific economic results of the agreement. If we wish to rely on the general public as an authoritative source of knowledge in this respect, it should be noted that the number of studies exploring the attitudes of people towards the TTIP is limited.

The cross-sectional material concerning EU public opinion seems to be provided by the research conducted within the framework of the Eurobarometer survey – carried out twice a year in spring and the autumn. The most current survey (Eurobarometer 83 – spring 2015) covered the EU’s 28 Member States, and 5 candidate countries – Albania, Montenegro, the Republic of Macedonia, Serbia and Turkey.

It should be emphasized that the TTIP issue was included in the Eurobarometer for the first time in the fall of 2014. The respondents answered the question (QA 19.5) formulated in the following way: “*Do you support or not a free trade and investment agreement between the EU and the US?*”. The same question was asked a little less than a year later (in the spring of 2015), which allowed the comparison of the European perception of the TTIP over time. It turns out that Europeans became somewhat more sceptical in their attitudes – more than a half of the surveyed Europeans gave their support to the idea (56%), but this was about 2 percentage points less than the previous year, while 28% of the respondents were against the TTIP (an increase in negative opinions of 3 percentage points). The rest of the group consisted of undecided respondents (16% – a decrease by 1 percentage point).

In 2015 the most anti-TTIP were Austrians (23% in favour to 67% against in 2015), Germans (31% in favour to 51% against) and Luxembourgers (37% in favour to 49% against), while the most favourable towards the TTIP were Lithuanians (79% in favour to 7% against), Romanians (78% in favour to 10% against) and the Irish (77% in favour to 12% against). A decline in support for the TTIP was reported in 14 Member States, an increase in 9, and the same sentiment in 5. It is worth noting that the largest decrease in support was recorded among traditional TTIP opponents – Austrians (a decrease of support of 16 percentage points) and its former enthusiasts – the Dutch (the support declared in 2014 at the level of 74% declined by approx. 11 percentage points).

Eurobarometer does not contain more questions explicitly exploring Europeans' attitudes towards the TTIP, that would indicate the expected economic benefits. Contextually perceiving other major threads of the Eurobarometer survey, it is worth noting that in 2015 unemployment remains for Europeans the most serious problem, next to the so-called “economic situation” and immigration. These are the issues raised by the respondents, both from the perspective of their outlook on their own country and the EU.

Another study, which included both European and American respondents, was conducted by YouGov on behalf of the Bertelsmann Foundation. On 23 February 2016, an online questionnaire was completed by 1,126

American citizens, and on 17-19 February 2016 by 2,019 German citizens. The Bertelsmann Foundation (2016) report summarizing the obtained results includes many comparisons to an earlier study commissioned also by the Foundation at another research centre – the PEW. At the time, the PEW interviewers conducted a telephone survey and the sample size was smaller, as it consisted of 1000 respondents.

The published report (Bertelsmann Foundation, 2016) shows that there are important differences between Germans and Americans in their attitudes to trade. Only 56% of the German respondents perceive increased trade relations with other countries to be something good (27% of the respondents are of the opposite opinion), while in America a positive opinion on the subject is shared by 82% of the respondents (13% of the surveyed people are of the opposite opinion). The German "openness" in this area decreased significantly – 88% of the respondents were in favour of the TTIP in 2014, and only 4% were against it. In the US, support for trade with other countries increased in 2014 in favour of openness in trade relations as 71% of the respondents were in favour and 23% had a negative view of this openness.

Germany also has far more opponents to the introduction of TTIP; this can be related from the results obtained in the Eurobarometer surveys (2014 and 2015). 33% of the surveyed Germans declare a negative attitude towards the agreement, and only 17% have a good opinion. In the United States, opinions have become very polarized: 15% of the respondents expressed their support and 18% their opposition. In the case of both countries, the proportion of undecided, insufficiently informed, or not at all familiar with the topic is devastatingly high. At the same time, roughly half of both German and American respondents expressed their interest in the TTIP, at the same time lacking commitment to participate in public debate on the agreement (approximately ¾ of the respondents on both sides of the Atlantic take no part in the debate).

This study makes an effort to present expectations of citizens concerning the impact of TTIP on the economy and society in a bit more detailed way than for example Eurobarometer does (see Table 1).

**Table 1.** The distribution of responses to the question: *How do you think the TTIP will affect the following in your country?*

| | Germany | | | | United States | | | |
|---|---|---|---|---|---|---|---|---|
| | **Positive** | **Negative** | **Neutral** | **Don't know** | **Positive** | **Negative** | **Neutral** | **Don't know** |
| economic growth | 27% | 26% | 19% | 28% | 29% | 23% | 8% | 39% |
| employment and labour market conditions | 23% | 28% | 22% | 28% | 21% | 27% | 11% | 41% |
| international competiveness | 29% | 24% | 19% | 28% | 24% | 22% | 11% | 43% |
| your country's global influence | 23% | 21% | 26% | 29% | 31% | 15% | 16% | 38% |
| environmental standards | 12% | 46% | 16% | 27% | 18% | 19% | 20% | 44% |
| workers' rights/social standards | 10% | 40% | 22% | 29% | 17% | 24% | 15% | 45% |
| cultural diversity | 24% | 17% | 30% | 28% | 26% | 12% | 22% | 39% |
| public services | 10% | 27% | 31% | 31% | 15% | 13% | 26% | 46% |
| democracy | 10% | 28% | 32% | 29% | 20% | 14% | 23% | 43% |
| regulatory sovereignty | 9% | 37% | 22% | 32% | 17% | 22% | 15% | 47% |

Source: The Report from the Bertelsmann Foundation survey, *op. cit.* p .8.

It should be noted that among the 11 categories, the first three are of a particularly macroeconomic nature. It seems that the sentiments of the respondents about the role of macro factors in defining the future related to the TTIP introduction are quite ambivalent, however, with a slight predominance of positive prognosis. Americans (29%) more than Germans (27%) expect stimulation of economic growth as a result of the TTIP and in their case, it is the second factor (immediately after "your country's global influence") in terms of importance for persons with a positive opinion of the agreement. Germans have the most (out of all the 11 categories) positive assessment of the chances of increasing their international competitiveness and stimulating economic growth if the TTIP comes into effect. The assessment of the TTIP impact on employment and labour market is negative for both Germans and Americans. However, even these highly positioned on the list of positive expectations of macro-effects and this last-mentioned category generating most of the bad associations cannot overcome Germans' reluctance to the TTIP due to "consumer protection", "environmental standards" or "workers' rights". Americans do not have such strong "for or against" attitudes. It is difficult not to notice that among the German and American respondents (such attitudes are definitely more present in the US) there is a visible lack of dominant views. Apart from the fairly equal number of mutually-cancelling extreme views, people who declare their neutrality and people who do not have the appropriate knowledge of the issue constitute a large group. The lack of knowledge is particularly evident in the declarations of the US respondents.

## 3. The use of Computable General Equilibrium Models – the Current State of the Research

The models that have been used so far to estimate the expected effects of specific economic processes/business ventures belong in the class of computable general equilibrium models (CGE). The disadvantages of these models include restrictive assumptions concerning full employment, as well as wage and price flexibility.

At the same time, it is hard not to notice that they provide quite a unique possibility towards a comprehensive and meaningful *ex-ante* analysis. These models are distinguished by:

- A high degree of disaggregation;
- Equations based on the microeconomic fundamentals;
- Increased use of information regarding the structure of the economy rather than the information contained in time series.

The European Commission clearly stresses that, despite the awareness of certain bias in CGE models, it considers this approach as the only reliable one for the purpose of determining TTIP effects (European Commission, 2013). In formulating limitations, the EC goes even further and indicates that not all of the available empirical analyses using these models should be treated equally. The results obtained by the *Centre for Economic Policy Research* (Francois et al., 2013) establish a compelling – for the EC – canon in this respect. There are other studies: Berden, Francois, Thelle, Wymenga and Tamminen (ECORYS, 2008); Fontagne, Gourdon, Jean (CEPII, 2013); Felbermayr, Heid and Lehwald (2013) and a study by Egger, Francois, Manchin, and Nelson (2015), which appeared relatively recently, and hence appears less-often than the others in citations.

All the models offer the "global" perspective. The estimates make use of the GTAP (Global Trade Analysis Project) database, which contains information on 113 countries and 57 sectors of the economy: the subsequent digits in the available versions of GTAP databases used in the study determine the degree of their relevance (version 9 is more relevant than 8; in version 8 the base year is 2007, in version 9 it is 2011). As to the methodological approach, the studies are either based only on CGE models or combine gravity models with CGE models.

In the summary of the content of these studies, it can be concluded that predicted macro-economic effects of TTIP on European economies are positive, regardless of the variant of the proposed liberalization. Their positive outcome is strengthened by increasing the degree of liberalization.

More detailed differences in all the five approaches (Ecorys, 2009; CEPR, 2013; CEPII, 2013; Bertelsmann/IFO 2013 and Egger et al., 2015), covering the data, the assumptions and the results, are shown in Table 2.

**Table 2.** Comparison of the results of the *ex-ante* models

| | **Ecorys, 2009** | **CEPII, 2013** | **CEPR, 2013** | **Bertelsmann/IFO, 2013** | **Egger et al., 2015** |
|---|---|---|---|---|---|
| Type of the model | CGE | CGE (MIRAGE) | CGE | Gravity model and CGE | Gravity model and CGE |
| Data base | GTAP 7 | GTAP | GTAP 8 | Undefined | GTAP 9 |
| Time | 2008-2018 | 2015-2025 | 2017-2027 | 10-20 years | 10-20 years |
| Change in % | | | | | |
| GDP forecast for the UE | 0.35-0.72 | 0.0-0.5 | 0.02-0.48 | 0.52-1.31 | 0.1-1.14 |
| GDP forecast for the US | 0.14-0.31 | 0.0-0.5 | 0.01-0.39 | 0.35-4.82 | 0.13-0.88 |
| UE bilateral exports | Undefined | 49.0 | 0.69-28.0 | 5.7-68.8 | Undefined |
| Real wages in the UE | 0.34-0.78 | No data | 0.29-0.51 | Undefined | Undefined |
| Unemployment rate in the UE (average) | Unchanged (assumption) | Unchanged (assumption) | Unchanged (assumption) | -0.42 (deep liberalization) | Unchanged (assumption) |

Source: W. Raza, W, J. Grumiller, L. Taylor, B. Tröster, R. Arnim, *Assessing the Claimed Benefits of the Transatlantic Trade and Investment Partnership*, Policy Note, 10, 2014, p. 2 and P. Egger, P., J. Francois, M. Manchin, D. Nelson, Non-tariff Barriers, Integration and the Transatlantic Economy, Economic Policy, 30(83), 2015.

The interpretation of the analyses, broken down by individual countries or group of countries, carries a positive message for Poland (Felbermayr et al, 2013). The effects of both variants do not show a deepening of the profit discrepancy between European countries. In the moderate variant, the peripheral countries (such as Poland) should gain more than the richer members of the EU. In the variant of deep liberalization, this effect is more flattened. Therefore, one can even speak of intensification of the process of convergence in Europe as a result of the introduction of the TTIP, which is visible particularly in the case of moderate liberalization. Specifically, GDP in Poland is to increase, depending on the degree of liberalization, from 0.3% to 3.73%. In respect to the Polish labour market, changes are also beneficial – an increase in employment (0.15% or 0.58%), a decrease in the unemployment rate (-0.13% or-0.53%) and an increase in the real wage (0.69% or 2.75%).

Meanwhile, national analyses indicate much lower beneficial effects (see Hagemejer, 2015) and Przybylinski, 2015). The first results obtained by Hagemejer shed quite a different light on the diversification of TTIP effects. TTIP benefits for Poland and the other so-called new EU members are smaller than for the older members of the EU, especially Germany. Hagemejer writes also quite clearly about the effect of trade diversion – the intra-EU trade is to be reduced while turnover with the United States increases. In Poland, the effect of trade diversion brings a relative increase in the price of imported goods, which, taking the high dependence of the Polish economy on imported intermediate goods into account, may lead to reduced competitiveness of Polish export goods. Hence, the estimates made by Hagemejer indicate a GDP growth of only 0.1% for Poland.

Przybylinski (2015) makes assumptions about changes to the Polish import and export using estimates provided by Hagemejer (2015) and performs an input-output analysis. According to the author, on the macro scale the TTIP effects for Poland are almost negligible. Growth of global output (and also GDP, assuming a fixed production technology) in the most advanced version is 0.2%. Furthermore, a short-term increase in the number of jobs by 42,000, expected in the long-term to reach 10,000, does not seem to be large (in 2014, 14.1 million people worked in Poland). Macroeconomic evaluation of elimination of non-tariff barriers is therefore quite neutral. Visible effects may, however, appear at the industry sector level, which may lead to changes in the production structure. The strength of these changes will be determined by the solutions adopted at the level of industries.

The study conducted by Felbermayr, Heid and Lehwald (2013) can be referred to when attempting to interpret the results of CGE models in the context of a widely understood geographical diversification of the TTIP impact on the world economy, including a negative TTIP impact on the so-called "third countries", a complaint that is frequently raised by TTIP opponents. In accordance with their results, elimination of tariffs under the TTIP will have the greatest toll on developing countries. These countries will have to face decreasing shares in global markets due to increasing competitive pressure in the EU and the US markets. Reallocation of trade links may be difficult due to a long distance to some alternative locations – it may be felt in particular by countries of North and West Africa, traditionally strongly associated with Europe, and potentially displaced – after the introduction of TTIP – by the United States. East Africa has a better prognosis for initiating or increasing other trade routes thanks to its favourable position relative to China, Australia and New Zealand. Felbermayr et al. suggest that neutralization of negative effects of trade diversion should occur through quick and effective completion of the Doha Round, by signing an agreement satisfactory to all the parties.

## 4. Criticism of the CGE approach – literature review

In literature, one can find criticism of the existing studies based on CGE model, such as in Raza, Grumiller, Taylor, Tröster, and Von Arnim (2014). First of all, the positive effects of TTIP are relatively low in relation to the long period of their occurrence and the costs incurred. Secondly, the adaptation costs are underestimated or not included in the studies (these underestimated costs are EUR 33-60 billion over 10 years). The costs excluded from the analyses are the costs associated with categories such as: current account balance, public budget and unemployment.

In the category of costs associated with the current account balance, it should be taken into consideration that if – as a result of the TTIP – import is to increase disproportionately in relation to export, it may result in devaluation and affect the level of domestic prices, as well as debt in foreign currency incurred by companies and individuals. In addition, new inflow of FDI may result in the shifting of profits to parent companies. Given the freedom of portfolio investment flows in liberalization processes, smaller countries with inferior competitive positions can be particularly vulnerable to rapid outflows of speculative capital. The authors emphasise that the estimates of current account surpluses in the results derived from CGE models do not take these factors into account.

When it comes to costs to the budgets of the European economies, they will have to bear the losses resulting from the lost revenue from tariffs, which will increase their fiscal deficits. In 2012, 12% of the revenue to the EU budget came from tariffs. Although TTIP proponents stress that the proceeds from the growing export should compensate for these losses, it needs to be noted that export growth has shown a slow tendency, while the decline of the tariff revenue will occur immediately. Despite the declaration of the European Commission concerning the possibility of restructuring the budget with a view to seeking other sources of revenue, the current context of the European and world economy raises reservations as to the effectiveness of the implementation of these promises. Economic downturn combined with quite a turbulent political situation (the migration crisis, the rise of populism in Europe and the US, etc.) does not bode well for great freedom in terms of shaping the budget.

Finally, the last criticism according to Raza, Grumiller, Taylor, Tröster, and Von Arnim (2014), specific to the labour market area, includes a reflection that the structural transformations of the economy related to the TTIP will be associated with structural unemployment, which may be persistent and long-lasting.

Many of these doubts are shared by Capaldo (2015) in his critical study. The author emphasizes the failure of the self-regulating market mechanism in the effective prevention of unemployment. He writes about a lack of automaticity in the mobility of labour force. This automaticity could be provided (in accordance with the assumptions of CGE models) by an efficient transfer of people who lose jobs in non-competitive sectors into other, promising sectors that are able to compete in the new liberalized economic environment. Capaldo, undermining the reliable operation of this mechanism, draws attention to the possibility of uneven dynamics of job creation in different sectors, especially unfavourable if fast elimination of jobs in non-competitive sectors (quite likely) was to be accompanied by slow employment growth in developing sectors. The author also perceives as important the problem of qualifications mismatch when attempting to match the workforce with job offers, as well as negative consequences of impoverishment of a substantial part of society previously employed in "traditional" sectors.

Capaldo (2015) questions the accuracy of the estimates of the TTIP impact on trade based on CGE models. He believes that insufficient consideration of the trade diversion effect significantly weakens the positive results. The author instead proposes the use of the United Nations Global Policy Model (GPM). The GPM represents a class of models based on Keynesian assumptions. Instead of the assumptions concerning full employment, the effective demand rule is used, and therefore economic activity is controlled by demand, instead of being dependent on productivity. The author stresses that the advantage of this approach is the ability to carry out a comprehensive regional analysis encompassing different regions of the world. Finally, Capaldo praises the GPM model for closer to reality – in his opinion – assessment of employment effects (using the statistics of the International Labor Organization), as it is based on Okun's law and hence allows the definition of the relationships between employment and growth in a dynamic approach, taking into account the so-called jobless growth. Capaldo's results are dramatically different from those obtained in CGE models (see Table 3).

**Table 3.** The simulation results provided by Capaldo, GPM model (selected data)

| | **Net Exports (% GDP)** | **GDP growth (Diff between %)** | **Employment (Units)** | **Employment Income (EURO/employee)** | **Net taxes (% GDP)** |
|---|---|---|---|---|---|
| US | 1.02 | 0.36 | 784,000 | 699 | 0.00 |
| UK | -0.95 | -0.07 | -3,000 | -4,245 | -0.39 |
| Germany | -1.14 | -0.29 | -134,000 | -3,402 | -0.28 |
| France | -1.9 | -0.48 | -130,000 | -5,518 | -0.64 |
| Italy | -0.36 | -0.03 | -3,000 | -661 | 0.00 |

Source: J. Capaldo, *The Trans-Atlantic Trade and Investment Partnership: European Disintegration, Unemployment and Instability*, Economia & lavoro 49.2, 2015 p.14.

The introduction of TTIP – according to Capaldo – after 10 years will lead to losses, not benefits, in terms of net exports as well as GDP and income from employment, and will result in loss rather than creation of jobs. There will also follow, according to the author, a significant replacement of income from employment in favour of income from capital and a decrease in budgetary revenues of the EU countries (mainly from the loss of revenue from indirect taxation). It should be noted that in his analysis Capaldo often explores slightly different aspects of the issues analysed by the authors of studies based on CGE models. Even Capaldo (2015) himself notes that: *"Our simulation does not call into question the results of other studies on the estimation of the impact of TTIP. We are more focused on effects of TTIP in terms of net exports, GDP, public finances and the distribution of income"*.

## 5. The Experience of NAFTA in the Context of TTIP

As previously mentioned, the debate about the TTIP focuses primarily on potential benefits for the participating countries in the form of increased prosperity and improvement of the situation in the labour market, including an increase in employment. Proponents of the signing of the agreement cite the rather optimistic results of empirical analyses conducted using CGE models, published, among others, by the European Commission. In this context, it seems interesting to assess the relevance of such *ex-ante* analyses using the example of the North American Free Trade Agreement (NAFTA), which has operated for 22 years. If it turned out that there are differences between the *ex-ante* projections and the *ex-post* assessment of the expected macro-economic effects of the agreement, it would be an indication that the projections of the potential benefits of the introduction of TTIP should be treated with some degree of caution and scepticism. This may mean that the expectations in relation to the TTIP formulated by the EU and US authorities, economists or the public opinion may not find a (full) reflection in reality.

NAFTA, signed in 1994 by the United States, Canada, and Mexico, created a free trade area between these countries. The countries participating in the agreement abolished duties in mutual trade, while autonomous customs duties were maintained in trade with third countries. The main premise which promoted the conclusion of the agreement was the fact that these countries had common economic interests. A close geographical location and, in the case of Canada and the United States, a common language also played an important role. The existence and successful expansion of the common market in Europe was also of considerable importance, as the newly signed economic agreement was to be competitive in relation to Europe. The basic objectives which were expected to be met through the functioning of NAFTA included the achievement of prosperity, the development of the participating countries and a favourable climate for private investment.

The *ex-ante* projections concerning macroeconomic effects of NAFTA presented in this paper are based on a review of the existing empirical research. Table 4 provides a summary of the results of the analyses conducted. When it comes to real GDP estimates, the results of empirical studies were relatively homogeneous. Hence, for example, in the case of the US, NAFTA was supposed to bring relatively insignificant benefits. Most of the *ex-ante* studies anticipated real GDP growth in the country to range from 0.1% to 0.3%. The results of the analyses were much more optimistic for Mexico, since they predicted real GDP growth above 2% (Grumiller 2014). Empirical research on the impact of NAFTA on Canada's GDP are few and far between and vary widely. For instance, Brown, Deardorff and Stern (1992) expected GDP growth of about 0.7%, Cox and Harris (1992) of 1.49%, while Roland-Holst, Reinert and Shiell (1994) estimated GDP growth at the level of 0.4-10.6% as a result of the functioning of NAFTA. Generally, in the light of the conducted research, the average GDP growth is 0.14% in the case of the US, 2.27% in the case of Mexico, and 1.1% in the case of Canada.

Taking changes in real wages into account, it was estimated that NAFTA would be beneficial for all the three countries, albeit to a differing degree. Again, the United States were supposed to gain the least benefits in this area (an increase in the level of real wages not higher than 0.2%). In the case of Mexico, the estimates were quite varied, depending on the inclusion or exclusion of the impact from foreign direct investment (FDI) in the studies. The estimates without taking into account FDI pointed to a rise in real wages of less than 1%, the influx of FDI into Mexico, however, increased the dynamics of wage rise to 6-9% (Sobarzo, 1991). With respect to Canada, a few empirical studies showed a relatively small increase in real wages, at the level of 0.4-0.5%, in the study of Brown, Deardorff and Stern (1992) and a relatively high increase, 1.3%, in the analysis of Cox and Harris (1992).

Analyses of the impact of NAFTA on employment are also quite varied for individual countries. For example, Hufbauer and Schott (1993) estimated that thanks to NAFTA, employment in the US would increase by 130,000-170,000 jobs within a few years. In general, most studies point to a small impact of NAFTA on employment growth in the United States (O'Leary et al, 2012). Much better estimates were obtained for Mexico. For example, Marwick (1991), Sobarzo (1991) and Roland-Holst, Reinert and Shiells (1994) predicted employment growth in the range of 2.4-6.6%. In the case of Canada time empirical studies were few and far between and the results were quite diverse. For instance, Roland-Holst, Reinert and Shiells (1994) made projections of changes in employment in the range of 0.61% -11.02%.

**Table 4.** The results of the most cited *ex-ante* analyses of the impact of NAFTA on basic macro-economic parameters of the participating countries (% change)

| | USA | Canada | Mexico |
|---|---|---|---|
| Real GDP | 0.0 to 2.07 | 0.12 to 10.57 | -0.35 to 11.39 |
| Real wages | -0.7 to 0.95 | 0.04 to 1.3 | 0.4 to 16.2 |
| Employment | -0.3 to 2.47 | 0.61 to 11.02 | -0.1 to 6.6 |

Source: Grumiller 2014, p. 8.

The comparison of the presented *ex-ante* projections with the results of *ex-post* analyses of the impact of NAFTA on economic results of the US, Mexico and Canada clearly indicates that the actual impact of NAFTA on the economies of these countries has been much lower than expected in the projections. For example, Caliendo and Parro estimated the effects of NAFTA in relation to real GDP growth in the period 1993-2005 at 0.08% in the case of the United States, 1.31% for Mexico and -0.06% for Canada. At the same time, it should be pointed out that these are the most optimistic estimates, though still ranking far below earlier projections (Caliendo, Parro, 2014). Other studies estimate the annual impact of NAFTA on US GDP at the level of 0.001-0.005% in 1994 and 0.006-0.041% in 2001 (Congressional Budget Office, 2013). Similarly, the results of the studies presented by the U.S. International Trade Commission indicate a negligible impact of implementation of NAFTA on GDP of the United States (Okun et al, 2003). On the other hand, the World Bank estimates indicate a beneficial effect of NAFTA on GDP per capita of Mexico, which rose by approx. 4-5% in the period 1994-2002 (Lederman et al, 2003). However, the results of those estimates have been challenged by other researchers, due to the fact that the data used by the World Bank were not reliable. Weisbrot, Rosnick and Baker using the same model and reliable data indicate that, as a result of NAFTA, the dynamics of economic growth in Mexico has been reduced (Weisbrot et al, 2004). Similar results were obtained by Romalis, who states that NAFTA has had no impact on US and Canada GDP; it has resulted, however, in a decline in Mexico's GDP by approx. 0.3% (Romalis, 2007).

When it comes to the impact of NAFTA on the dynamics of real wages, the results of the research carried out *ex-post*, as in the case of GDP changes, show significant deviations from the results of the *ex-ante* analyses (expectations). The most optimistic results were received by Caliendo and Parro (2014). According to those authors, the reduction in trade barriers had a positive impact on real wages, causing their growth in the period 1993-2005 by about 0.11% for the US, 1.72% for Mexico and 0.32% for Canada. The results of the other estimates are not as favourable. For example, Polaski states that the increasing disparity between the growth in labour productivity and the dynamics of real wages in the United States and Mexico can be explained by a declining bargaining power of trade unions as a result of the signing of the free trade agreement (Polaski, 2006). An empirical study on concerns about elimination of jobs as a result of NAFTA seems to confirm this thesis (Bronfenbrenner, 2002). In addition, McLaren and Hakobyan (2010) said that the rate of increase in wages in the industrial sectors of the US that were to the greatest extent under the influence of NAFTA was clearly lower than in the other sectors. Waldkirch (2003), in turn, proved that the inflow of foreign investment to Mexico as a result of the signing of NAFTA caused an increase in labour productivity. However, the effects of FDI on the average real wages in Mexico were negative, or at best, negligible. Hanson (2003) states that NAFTA has contributed to the growth of income inequality in Mexico. The wages of skilled workers in the North of Mexico, where the largest influx of FDI was recorded, have increased by much more than the wages of workers in the South, who as a rule are less educated and unskilled. In general, the relationship between NAFTA and income inequalities, mainly in Mexico, seems to be widely accepted (Abbott, 2004). In conclusion, most of the *ex-post* studies found no significant positive effect of NAFTA on real wages in the countries that signed the agreement.

A similar situation occurred regarding the impact of NAFTA on employment. For example, Scott (2011) stated that 683,000 jobs in the United States were eliminated during the period 1994-2010 as a result of a deficit in trade with Mexico, which appeared as a result of the signing of NAFTA. Kletzer (2002) estimates that the United States lost 1,238,000 jobs in connection with an increase in imports after reducing trade barriers, which was approx. 24-27% loss of all jobs in the industry and 10.7% of the total number of lost jobs in the period 1993-1999. Other studies indicate at least 845,000 jobs that have disappeared in the United States since 1994 as a result of an increase in imports from Canada and Mexico (Public Citizen's Global Trade Watch, 2014). It would seem that, in the case of Mexico, one would expect a more optimistic situation in the labour market as a result of the occurrence of prolonged surplus in trade with the United States as a consequence of NAFTA, but the estimates show a completely different picture in this respect. For instance, Polaski (2006) argues that NAFTA has caused a disappointingly small gain in jobs in Mexico, and sees the causes of this situation in increasing labour productivity. Salas (2006) believes that about 1/6 of agricultural workers in Mexico lost their jobs since the beginning of the 1990s, mainly due to NAFTA. The greatest losses occurred in maize production in the years 1991-2000, in which 1,013,000 jobs were lost. The researcher also argues that the inflow of FDI to Mexico has increased significantly as a result of the signing of NAFTA, but it has largely manifested in buying out the existing assets, and consequently it has not had such a major impact on the real economy as was expected. This is a particularly interesting observation, as the most optimistic *ex-ante* projections for Mexico emphasized the significant positive impact of FDI on the country's economy.

## 6. Conclusion

Social expectations regarding economic effects of TTIP are not clear on both sides of the Atlantic. It seems that their clarification is hindered by uncertainty that largely stems from a lack of knowledge that citizens consider sufficient for the formulation of more definite views of their own. More Americans than Germans are uninformed, and Germans are more critical of TTIP than Americans. This kind of negative attitude, however, is not dominant among other Europeans, although over time, an increase in negative attitudes in Europe can be seen. It seems that the process of formulating expectations concerning economic effects of TTIP is still ongoing and it can to a large extent be influenced by a reliable information policy to promote an objective message understandable by the average citizen.

CGE models have many limiting assumptions that *ex-definitione* should make one careful in developing too many free and wide interpretations of the conclusions drawn from their results. They are, however, a useful tool for exploring effects of TTIP, bearing in mind their restrictions and limitations of *ex-ante* analyses.

The comparative analysis of the *ex-ante* projections and the *ex-post* empirical research results in relation to effects of NAFTA indicates that generally speaking, most *ex-ante* models tend to overestimate benefits and underestimate disadvantages arising from free trade. The NAFTA experience exposes weaknesses of *ex-ante* simulations, therefore the authorities negotiating the Trade and Investment Partnership should take into account the NAFTA experience and treat projections on effects of TTIP with an appropriate dose of scepticism.

The example of NAFTA could be a signal that expectations in relation to the TTIP formulated by various bodies may not (fully) reflect reality.



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# Value Co-creation of Xiaomi in China

Hsien-Chih Kuo[1], Pin Luarn[2], I-Jen Chen[3]
[1]Vice President, Enterprise & carrier BU, Fareastone Telecommunications Co., Ltd.,
[2]Professor, National Taiwan University of Science and Technology,
[3]Assistant Manager, Enterprise & carrier BU, Fareastone Telecommunications Co., Ltd.

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ABSTRACT
**Purpose**
Since service-dominant logic is a theory with co-creation as its central concept, this study uses service-dominant logic as a basis to analyse the business model and factors of Xiaomi Technology so as to understand the reason that Xiaomi Technology was able to develop diverse products within a short time span.
**Design/methodology/approach:**
The present study adopted the case study approach. In that direction, the focus group methodology was used. Finally, the proposed conceptual framework was checked with specialists in Taiwan and China to get the Managerial Implication.
**Findings:**
The results of this study can help subsequent businesses understand how to use value co-creation to strengthen business models.
**Research limitations/implications**:
A limitation stemming from using case study analysis, this study conducted interviews that enabled Xiaomi-related personnel to answer research questions. Although the respondents came from diverse backgrounds, there are still limitations.
**Originality/value**:
Very few studies exist on co-creation in the context of case study research. This study utilizes the concept of co-creation to explore Xiaomi's operation in China. Furthermore, this paper also poses management implications of the findings.



## 1. Introduction

Service Dominant (S-D) Logic has already become the most interesting research direction in current research and practice (Wagner and Benoit, 2015). S-D logic uses service as its fundamental basis to explain how businesses, customers, and partners establish value co-creation through service and interaction. Its core lies in the interaction and exchange between participants, collaborative partners, and customers, of which value co-creation is produced during the process of interaction (Grönroos, 2008; Grönroos and Voima, 2013; Payne et al., 2008; Vargo and Lusch, 2008a,b; Yi and Gong, 2013). That is to say, S-D logic can induce businesses and customers to collaborate with suppliers, constructing collaborative models that form co-creation of value, production, value networks, and communication (Lusch et al., 2007). However, S-D logic has yet to be verified in practice (Lusch and Vargo, 2011).

To understand the application of S-D logic in practice, Xiaomi Technology, since it was founded in 2010, adopted a "Fan-Centric" business model (Shih et al., 2014). By using a model where it uses a network to sell, interact, and form relationships, Xiaomi's fans were able to actively co-create corporate and brand marketing content. At the same time, Xiaomi's founder Lei Jun constructed an ecological chain for Xiaomi to invest in companies with innovative concepts. Current partners with innovative ideas can also collaborate with Xiaomi. This means that Xiaomi's co-creation of value does not just exist in the relationship with consumers but also from business to business. This is the same concept as the one that scholars have pointed out, where service-dominant logic focuses on the network relationship between business and business, and business and customer, emphasizing value use (Lusch and Vargo, 2009). In other words, the concepts of Xiaomi's operation and S-D logic serve the same purpose.

The paper's structure is as follows. First, there is a discussion of the rationale behind S-D logic and value co-creation highlights some of these concepts' key features. Previous studies then provide the basis for an integrative model of SDL and resource integration. Second, the paper sets out to explain the processes used to apply this model to the accessible Xiaomi service context. The final section discusses the main findings and conclusions, looks for innovative ways to confront



†Corresponding Author: I-Jen Chen
E : Maxchen0811@gmail.com
*DOI:* 10.25103/ijbesar.111.03

value co-creation, and closes by addressing the research and managerial implications of this study.

## 2. Conceptual Framework

### 2.1. Service-Dominant Logic

S-D logic is an alternative to the traditional goods-centered paradigm for understanding economic exchange and value creation (Vargo and Akaka, 2009), which includes the relationship that tangible resources (raw material or physical products), operant resources (skills and knowledge of customers, employees, and people), organizations (cultures), and information (knowledge about the market, competitors, and technology) have with competitors, suppliers, and customers (Navarro et al., 2014). The service-centric perspective emphasizes the interactive process between manufacturers and providers, and recipients and customers, and not just on units of output. Collaboration is needed for value co-creation and the benefit of others (Lusch et al., 2007). That is to say, in service-oriented logic, the process of value creation, which has traditionally focused on suppliers, has now turned to putting its customers at the center (Vargo and Lusch, 2008a). The concepts of S-D logic can be seen in Figure 1.

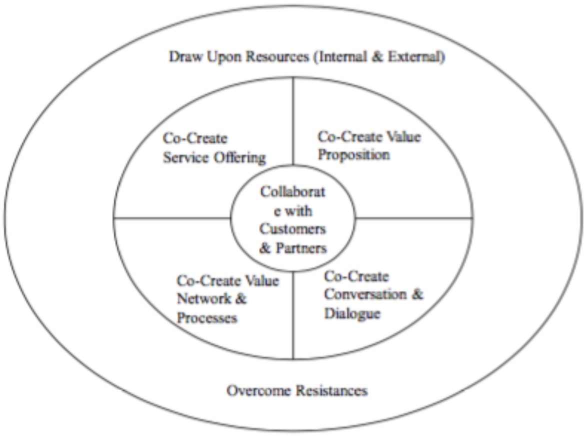


**Figure 1.** Concepts of S-D Logic

S-D logic differs from product-dominant logic in that product-dominant logic focuses on the product itself, emphasising production lines, supply chain management, pricing strategies, marketing, and the like. Product-dominant logic utilizes an enterprise-centric mode of operation to achieve the purpose of maximizing corporate interest. Meanwhile, service-dominant logic is service-oriented and customer-centric. Enterprises provide value proposition through bilateral dialogue to co-create value (Lusch and Vargo, 2006). Thus, the operations of service-dominant logic lie in the ability of producers to internally establish co-created service and externally integrate consumer experiences to co-create value so as to attract consumers (Lusch et al., 2007, the concepts of service-dominant logic are summarized in Table 1).

### 2.2. The Application of SDL

Scholars like Mills and Morris (1986) and Bettencourt (1997) have already pointed out that consumers can play an active role in the process of providing service. This concept has existed for a long time. Taking self-service for example, IKEA lets customers assemble products themselves. Thus, customers can be viewed as part-time employees. The findings of Kinard and Capella (2006) and Kosteroglou et al. (2016) also indicates that higher consumer involvement leads to higher perceived relational benefits. The research of Navarro, Andreu and Cervera (2014) points out that customers are a necessary factor in the process of value creation. Service providers must interact and share knowledge and practical experience with customers during the consuming process.

**Table 1.** The Concepts of Service-Dominant Logic

| Concept | Description |
|---|---|
| Value drivers | Value is determined by the customer (value-in-use) |
| Value creators | Businesses, managers, employees, supply chain partners, and consumers |
| Value creation process | Value proposition is proposed by enterprise and new value is created after consumer usage |
| Purpose of value | Mutually beneficial to enterprises, related personnel, and consumers |
| Business perspective | Propose value proposition for product, co-service model |
| Product | Interactive and co-created subject of business and consumers |
| Consumer | Co-creates value through integrating enterprises, related personnel, and products |

According to Lusch et al., (2007), customers and partners are the core of service-dominant logic. They create products and services that meet the needs and expectations of customers through value co-creation and collaboration. With this, customers will generate higher perceived value of the brand. In addition, SDL can be applied to value creation chains in businesses (Lusch and Vargo, 2006). Cova and Salle (2008) applied SDL to the B2B workflow. Their findings indicate that the network of suppliers and customers needs interaction for value co-creation. Prahalad (2004) suggests that the basis of co-creation needs to be established in the process of interaction between suppliers and customers and the managing of customer experiences. This can be called the experience-centric co-creation view, which is also the main subject of enterprise value (Lacoste, 2015).

Thus, the key of value co-creation lies in the enterprise, customers, and partners constructing a co-created model through network relationships. Like what Giarini (2000) indicates, the SDL value co-creation model exists during business co-production and the use of the product. Lacoste (2015) uses SDL as a basis, and through interviews with five companies, the SDL model is used to develop a B2B value co-creation model. Two stages are proposed: supplier interaction focusing on redesign and the customer end emphasizing product functionality. Research findings suggest that service is the core to maintaining value co-creation. Focus has shifted from the supplier to the customer. Businesses need to integrate the supply cycle to provide the desired products of target customers. This research is also one of the few whose findings uses SDL as its central concept to explore practices.

The value co-creation basis of S-D logic will be followed by the description of using Xiaomi to explore practice and factors of value co-creation during enterprise management. The respondents were asked three questions: How did Xiaomi guide the process of value co-creation? How does Xiaomi co-create value during the interactive process? What are the reasons that suppliers are willing to co-create value?

## 3. Method

Scholars point out that qualitative research can be used to discuss new concepts (Gummesson, 2002). Furthermore, case studies facilitate the development of theories (Dubois and Araujo, 2004). This study chose to use Xiaomi as a subject because Xiaomi does not have its own factory. Instead, its products are produced by its partners. Meanwhile, Xiaomi established miliao to interact with consumers, keeping abreast of consumer demand and creating a fan-centric model (Shih et al., 2014). That is, the business model of Xiaomi is centered on co-creation. Thus, this research adopts a case study method using interviews to understand the co-created business model and influencing factors of Xiaomi. Interviews were conducted until the respondents were unable to provide new information.

This paper took the execution method of Lacoste (2015) into consideration. Potential respondents were first asked for their willingness to participate. Those who were willing were then invited to an undisturbed conference room. Sound recording was used to help record and edit interview content. The first phase of the study integrates the researchers' concepts towards the research and obtains relevant second- hand information. The second phase of this study utilizes one-on-one discussions with the respondents in order to learn the method that Xiaomi uses to integrate suppliers and customers.

To gain perspective from collaborative partners, this study conducted interviews with Xiaomi's partners in China. A total of 5 major firms were interviewed. All firms had collaborated with Xiaomi for more than 4 years, and they had generated more than 70% of Xiaomi's production quantity. All respondents were familiar with Xiaomi's business model. Interview times were approximately 1-2 hours. The interviews with Xiaomi users were conducted with those who had over 1 year of experience with miliao. Its interview structure follows the structure of service-dominant logic. Interview times were approximately 1.5-2 hours. The data collection method consists of semi-structured, in-depth interviews with the OEM's managers (see Table 2).

This study used interview recordings and content analysis to examine interview data. All data were labelled and analysed according to research content. Furthermore, the data were combined with reference data for the discussion with senior respondents. This corresponds with the triangulation proposed by Woodside and Wilson (2003). Research conducted through multiple approaches is beneficial towards testing the hypothesis and explaining the source of existing knowledge (Cavaye, 1996).

**Table 2.** Basic Profile of Respondents

| Number | Position | Description |
|---|---|---|
| 1 | EVP | Xiaomi's OEM partner company Collaboration exceeds 4 years |
| 2 | PM Director | Xiaomi's OEM partner company Experience exceeds 20 years |
| 3 | PM Manager | Xiaomi's OEM partner company Experience exceeds 10 years |
| 4 | Marketing Director | Manager of Xiaomi Experience of 6 years |
| 5 | Sales Manager | Manager of Xiaomi Experience of 4 years |
| 6 | Consumer | Used miliao for approximately 2 years |
| 7 | Consumer | Used miliao for more than 2 years |
| 8 | Consumer | Used miliao for approximately 3 years |
| 9 | Consumer | Used miliao for more than 3 years |
| 10 | Consumer | Used miliao for more than 1 year |
| 11 | Consumer | Used miliao for approximately 2 years |

## 4. Findings

In consolidating the 11 respondent interviews, the structure of this study used service-dominant logic as a basis to analyse the business model of Xiaomi in mainland China. This study found that Xiaomi applied a collaboration-centric concept in constructing a value co-creation business model. This study also analysed external and internal factors, including the external factors of technology and culture and the internal factors of sense of identity, ecological chain of community, and fan-centric concept, which are summarized as follows:

### 4.1. Xiaomi Technology Based on Service-Dominant Logic

This study's literature review notes that business management establishes value co-creation and benefits others through collaboration (Lusch et al., 2007). For Xiaomi, numerous respondents stated that the biggest difference between Xiaomi and other brand manufacturers lies in its collaborative model. Xiaomi is willing to establish partnerships with suppliers and customers, enabling suppliers and customers to co-create new products. This is also the key to Xiaomi's rapid introduction of new products. Respondents noted that:

*Xiaomi does not have its own factories. It establishes collaboration with customers and partners. This is the biggest difference between Xiaomi and other companies. Many recent new products were produced due to the recommendation and development of customers and partners. (Respondent 5)*

*Xiaomi employs an open attitude with a fan-centric concept towards customers. Not only does Xiaomi allow customers to* *co-develop software, the founder also personally responds to customer demands. As for its partners, Xiaomi regularly holds supplier conferences to exchange and provide operating conditions. They can jointly solve supply chain problems and find new opportunities for development. The founder calls this the business community ecological chain, which lets customers of Xiaomi and related business co-create products. (Respondent 4)*

Likewise, the literature points out that an enterprise's competitive advantage comes from customers and partners participating in co-creation and co-production, of which customers are co-creators of value, and enterprises are the integrators. This includes four concepts of co-creation: co-creating value propositions, co-creating conversations, co-creating service offerings, and co-creating value networks and processes (Lusch, Vargo & O'Brien, 2007). This study found that not only does Xiaomi integrate suppliers and customers, Xiaomi also establishes a model of co-creation. The model of sequence for the four concepts of co-creation is as follows: first, Xiaomi converses with customers through miliao to understand customer needs, and even keeps abreast of the potential quantity demanded through pre-orders; next, Xiaomi uses supplier conferences to establish partnerships and explain its value proposition; and finally, Xiaomi co-produces service offerings with its suppliers and customers. This study utilizes the four co-creation concepts of service-dominant logic to consolidate interview data, as shown in Table 3.

**Table 3.** The Implementation of the Concepts of Co-creation

| Concept | Interview content |
|---|---|
| 1. Co-creating conversations | Xiaomi attaches great importance to miliao. Partners can assist with any item. Xiaomi insists that it runs miliao itself (Respondent 5).<br>I joined miliao before Xiaomi phones hit the market. In addition to chats and discussion, I also assisted the development of various software, and I could even have discussions with the manager. This gave me the feeling of being respected (Respondent 10).<br>Xiaomi's founder, Lei Jun, was willing to take the time to communicate and discuss with suppliers. Thus, Xiaomi got the support of us suppliers (Respondent 2). |
| 2. Co-creating value networks | Lei Jun wants to establish an ecological chain to let suppliers cooperate with one another (Respondent 1). |
| 3. Co-creating value propositions | Xiaomi constructed many concepts of the ecological chain that centers on smartphones. It links the applications of related services through software and the Internet (Respondent 5). |
| 4. Co-creating service offerings | Xiaomi constantly introduces new products, such as adding a chip in air-conditioners so smartphones can be used to increase the remote-control function. In addition, Xiaomi's supply chain is constructed on the basis of software that expands a variety of new applications (Respondent 4). |

*For smartphone brands in China, it is best to have the quantity demand first to control cost so the product can be launched onto the market at a lower price. This will seize the customers' attention and effectively increases sales within the shortest time. When Xiaomi develops products, it will first release the code in miliao so customers can pre-order and assist the with development. This way, Xiaomi grasps the quantity demanded. Next, Xiaomi shares customer information and discusses production difficulties with suppliers at supplier conferences. It views its suppliers as partners, jointly developing related products (Respondent 5).*
*Xiaomi is unique in that it brings related businesses into its ventures on the market. It becomes closer to each vendor by holding events, not by using management or blockade methods. Xiaomi willingly assists vendors in carrying out development and innovation, thereby increasing its bond with the vendors, who in turn are also willing to assist Xiaomi in co-creating new products (Respondent 2).*
*Xiaomi's founder, Lei Jun, really knows how to create a vision. During meetings, Lei will convey the goals of Xiaomi, unlike some international brands that only put forward the cooperation requirements. Xiaomi's meetings are very open discussions. Proposals that benefit supply chain development can all be put forward. Afterwards, suppliers will fully cooperate with the production and launch. This is also the main reason that Xiaomi was able to rapidly introduce a great variety of products in recent years.*
*I have been using miliao for 3 years. During this time, I provided many recommendations for software updates, and Xiaomi accepted the majority of them. When a product hits the market, I find the software modified in accordance with fan recommendations, making me willing to continue helping and recommending Xiaomi products (Respondent 8).*

Thus, Xiaomi grasps customer needs through a model (miliao) of interacting with customers. At the same time, it uses pre-orders to grasp the quantity demanded. Next, Xiaomi lets suppliers join the ecological chain (value network) through supplier conferences. The suppliers can assist in developing new products and enter the market using the Xiaomi brand. Then, Xiaomi promotes with miliao so fans can provide assistance and recommendations, thereby achieving the goal of conveying value propositions and co-created service offerings, and thereby creating a virtuous circle (co-creating conversations, value networks, value propositions, and service offerings).

### 4.2. Internal Factors

In using a collaborative model to integrate suppliers and customers, Xiaomi establishes a co-created model. As for the details of the practice, based on the consolidated interviews, this study found that Xiaomi's operation ran from business to customer, utilizing a sense of identity, a business community ecological chain, and a fan-centric concept to strengthen its business model.

First, the concept of identity was mentioned by all respondents. Mainly, Xiaomi's founder, Lei Jun, views each partner as one of his own people. Lei also gives suppliers better conditions when collaborating. As a result, many suppliers are willing to assist Xiaomi in product manufacturing and development. In addition, Lei also personally replies to fan questions. Respondents noted that:

*Collaborating with Lei Jun is easy. There is no need to send gifts. Lei stresses professionalism and manufacturing capacity. Collaboration is based on mutual trust to jointly solve problems encountered in the production process. For example, the raw material of Xiaomi is taken care of by Xiaomi itself. Xiaomi trusts the estimated quantity provided by the assembly plant, directly sending it from the raw material end to the supplier. At the same time, the conditions provided are better than those of American brand vendors. These factors all inspire suppliers to extend considerable heartfelt effort (Respondent 1).*

*For example, in July of 2014 there was a rumour of liquidity problems for a supplier. It was said that the supplier would go out of business by September. Lei Jun assisted said supplier with cash to help it overcome difficulties, because Lei considered Xiaomi's relationship with various vendors to be a partnership. Lei did not want any issues that would break Xiaomi's supply chain (Respondent 3).*

*One time, I complained about the shortcomings of Xiaomi's software and to my surprise, it was Lei Jun that responded. I was flattered. This also gave me the impression that Xiaomi was a business that valued customers (Respondent 7).*

For the supply chain network, Xiaomi is constructed on the network and proposition of value co-creation. Xiaomi comes closer to suppliers through activities and supplier conferences. Suppliers can collectively enjoy Xiaomi's customer data and propagate the operational goals that Xiaomi sets to achieve in the future. In addition, Xiaomi can also gain an understanding of the supplier's implementation problems and obstacles and jointly seek development opportunities. Respondents state that:

*Xiaomi's founder is willing to spend time finding suitable people or partners. When he decides to cooperate with you, he will think from your perspective. For example, he will give higher gross profit, the cost of raw material will be borne by Xiaomi, and inventory will be absorbed by Xiaomi. Thus, most suppliers willingly comply with Xiaomi's time frame, enabling Xiaomi to launch numerous products within a short time (Respondent 4).*

*Compared with some international brands that have many requirements and make withdrawals, Xiaomi views its original equipment manufacturers (OEM) as its partners, and so its OEMs are also willing to devote more effort. For example, when Xiaomi's ERP system had inaccurate or no data, Xiaomi had to manage data using old methods, and errors in material preparation would often occur. However, Xiaomi trusted its OEMs, and the OEMs were also willing to assist in reducing the chance of error for material preparation (Respondent 2).*

*Compared to major international brands that predict consumer demand using historical data, Xiaomi instead uses pre-orders to grasp the quantity demand and give us orders to produce. In addition, Xiaomi bears the raw material cost, putting us under less pressure in terms of cost. Risk is also borne by Xiaomi. Relatively speaking, other major internationals put us under higher pressure in terms of cost (Respondent 2).*

*Xiaomi is unique in that it brings related businesses into its ventures on the market. It becomes closer to each vendor by holding events, not by using management or blockade methods, and founder Lei Jun is even able to name each vendor. Lei discusses the development and innovation of production, and discloses almost all information. This increases the sense of trust and bond that suppliers have with Xiaomi, and suppliers also become willing to co-create new products with Xiaomi (Respondent 1).*

This paper discovered that Xiaomi uses a fan-centric concept to construct a relationship with its customers. For example, before a new product is launched onto the market, Xiaomi conducts promotions and pre-orders through miliao. Not only does this allow customers to join in and assist development, it also enables Xiaomi to grasp the needs of customers. Respondents note that:

*In simple terms, the key to Xiaomi's model lies in directly converting its customers to fans so that they are willing to design and modify products with Xiaomi. (Respondent 5).*

*The MIUI Forum enables customers to download software to try out for free. The forum lets customers submit their trial experience reports each Tuesday, while software is updated every Friday (also called "orange Friday"). The use value is basically completely decided by my demands (Respondent 6).*

*I like to help Xiaomi improve the software on smartphones. I have obtained the design engineer edition Xiaomi smartphone, and this makes me feel a sense of honor and worth that sets me apart from other customers. Xiaomi's development centers on me. This increases my loyalty to Xiaomi. (Respondent 8)*

Xiaomi utilizes a sense of identity, a business community ecological chain, and a fan-centric concept to strengthen its relationship with suppliers and customers. Thus, its partners are more willing to assist in developing new products, increasing the efficiency and competitiveness of launching new products by Xiaomi's overall supply chain.

**4.3. External Factors**

Business management is impacted by external factors, and Xiaomi is no exception. After consolidating the interview data, this study found that technology and culture impact Xiaomi's business model. The development of technology enables Xiaomi to construct a platform of bilateral communication, and, especially in the present age of state-of-the-art Internet, Xiaomi can use the Internet to connect with suppliers and customers. Xiaomi's bilateral communication with customers, such as miliao, can smoothly grasp consumer preferences and share that information with suppliers. Respondents state that:

*The key to why Xiaomi's products can be sold at low prices is Xiaomi's proficiency in controlling costs. In particular, Xiaomi uses the Internet to connect with customers and suppliers. First, Xiaomi grasps the quantity demand through interaction on miliao. Then, with assistance from its partners, Xiaomi calculates the quantity demand of raw materials and tackles reducing the defect rate. For the latter in particular, Xiaomi trusts and respects suppliers, and of course, suppliers are willing to make every effort to help, which effectively reduces costs caused by loss (Respondent 2). With assistance from the current Internet and technology, Xiaomi is easily able to strengthen its relationship with its partners and co-create* *and co-develop new products, making collaborative operation possible (Respondent 4).*

Afuah and Tucci (2003) note that culture impacts business models and strategic development. The respondents of this study have also mentioned this concept. In particular, Chinese consumers have a preference for their own local brands. Respondents state that:

*Price comparison is very prevalent in China's market. Products need to be sold at lower prices to attract consumers, or else they will be easily eliminated by the market. Generally, if a company can grasp the quantity demand and sell at low prices, it can gain a competitive advantage for approximately six months to develop newer products. This is how Xiaomi improves competitiveness (Respondent 5).*
*The people of Mainland China hold nationalist beliefs. Since Xiaomi is a Chinese brand, and Xiaomi uses miliao to successfully achieve closer relations, Chinese people have a high degree of acceptance of Xiaomi smartphones. However, Xiaomi's development overseas does not include the support of Chinese nationalism, making it crucial for Xiaomi to introduce new products to attract consumers to buy Xiaomi smartphones. For example, the Xiaomi Power Strip set a worldwide record by selling 5 million in a day (Respondent 2).*
*Xiaomi is popular in China because we have a preference for Chinese brands. We wish to work together to build a world-class brand. In addition, Xiaomi emphasizes a high CP index which compels me to buy Xiaomi products (Respondent 9).*

That is to say, technological factors strengthen Xiaomi's relationship with suppliers and customers, increasing the possibility for collaborative development. Furthermore, culture influences the degree of acceptance of local people. Xiaomi uses miliao to grasp Chinese people's demand for smartphones and then provides appropriate products to meet demand.

## 5. Discussion

This study utilizes the concept of co-creation to explore Xiaomi's operation in China. The research results are shown in Figure 2. The three major findings are as follows:

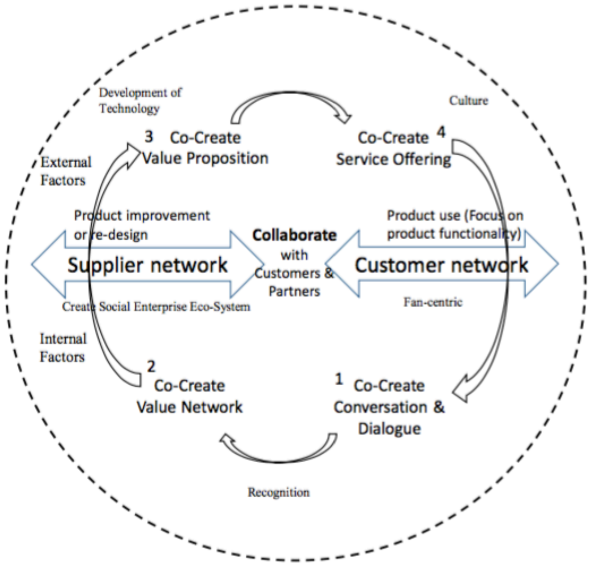


**Figure 2**. Xiaomi's business model

A Collaborative Business Model
As Shih, et al., (2014) note, Xiaomi uses a fan-centric concept for its main operating activities. The study found that in addition to embodying a fan-centric concept, Xiaomi also shares its customer information through regularly-held supplier conferences. It views its suppliers as its partners and utilizes its business community ecological chain to strengthen its relationships with suppliers and customers. This enables Xiaomi, who does not possess its own factories, to rely on the assistance of suppliers and customers to develop a variety of products at the lowest cost and the fastest speed.

The Formation of a Co-Created Cycle
Service-dominant logic features four concepts of co-creation, including co-creating conversations, co-creating value networks, co-creating value propositions, and co-creating service offerings. After analysing the case study of Xiaomi, this study found that Xiaomi uses miliao to interact with customers (co-creating conversations), then Xiaomi shares the gathered information in supplier conferences (co-creating value networks), thereby creating a business community ecological chain that also gives a sense of identity to suppliers. At the same time, Xiaomi conveys its value proposition of operations at supplier conferences (co-creating value propositions). Finally, Xiaomi provides service offerings (co-creating service offerings). In other words, the four concepts of co-creation have an order that forms a cycle of development.

The Influence of External Factors
Through analysing the interviews, this study found that the reason for Xiaomi's success in China is that with technological advance, Xiaomi can successfully construct a collaborative platform and use the Internet for communication and discussion. In addition, this study also found that business operation is impacted by cultural background. China is highly supportive of local brands, and Xiaomi's products incorporate a low pricing strategy, successfully attracting the attention and support of the Chinese public.

## 6. Conclusions and Implications

### 6.1. Theoretical Implications

On the aspect of theoretical contribution, this study uses service-dominant logic as a basis to construct Xiaomi's co-created business model and development sequence. Furthermore, this paper proposes that in Xiaomi's development of collaboration with partners and customers, Xiaomi first grasps the customer's point of view before using the business community ecological chain (value network) to share data and value propositions with (suppliers). Finally, Xiaomi integrates partners and customers to jointly provide related products or develop new products.

That is to say, this study clarifies the importance of a collaborative concept in S-D logic, which allows enterprises to grasp the thoughts of customers and integrate resources from partners to co-create products that best meet customer demand. In addition, this paper also reveals that Xiaomi's operations are impacted by technology and culture.

### 6.2. Managerial Implications

The results of Xiaomi's case study confirm the core of service-dominant logic: collaboration can be applied to the daily operations of a business. In particular, enterprises that want to operate in China in the future can refer to the methods of Xiaomi. Overall, this study can be summarized in the following three points:

The Supply Chain of Partnerships
Supply chains are no longer based on management (enterprise resource planning), but building partnerships. Xiaomi established a business community ecological chain to integrate suppliers and customers. By sharing with each other, each partner in the supply chain is truly able to understand customer needs. Just as the research findings of Shih et al., (2014) indicate, social media is the center of Xiaomi's operations. The findings of this study also suggest that Xiaomi utilizes supplier conferences and miliao to integrate suppliers and customers, enabling Xiaomi to rapidly produce various innovative products to meet customer demand and strengthen the competitiveness of its supply chain.

Pre-Purchase Communication
After conducting the interviews, this study found that to increase product sales, companies not only need to understand customer behaviour but also the behaviour of customers before they make purchases. Xiaomi uses miliao to interact with customers, thereby obtaining information on customer preferences. This even allows customers to co-develop products with Xiaomi. The founder also personally responds to customer questions. Customers gain a sense of identity before purchasing, and, afterwards, they are willing to continue to help update software and make recommendations.

The Influence of Technology and Culture
For business management, the development of technology has a great impact on businesses. In the present day of technological advances, Xiaomi uses social media to construct miliao's social network. Xiaomi provides open source codes on miliao so fans can assist in developments and uploads. This is a cloud sharing platform established by using the Internet. At the same time, Xiaomi is also able to obtain customer preferences on miliao, and thereby analyze (big data) the direction of product development. These are all crucial to enhancing Xiaomi's competitiveness.

On the concept of culture, this study indicates that businesses operating in China need to pay attention to cultural influences. Businesses can use technological advances to continue interaction and grasp that Chinese customers like products with low prices and high cost-performance ratios. First, businesses need to attract the attention of customers, and then they need to continue to provide services to customers to maintain the stability of the relationship between products and customers. Hence, customers will also be willing to assist businesses in developing new products. The same is true for suppliers. This will provide a higher gross profit and reduce the risk of error in material preparation, and suppliers will be more willing to make every effort in assisting development. This is the key to why Xiaomi has been able to continue introducing new products in recent years.

### 6.3. Further Research

Using case study analysis, this study conducted interviews that enabled Xiaomi-related personnel to answer research questions. Although the respondents came from diverse backgrounds, there are still limitations. Future research can refer to the findings of this study, and develop quantified questionnaires for verification to strengthen the integrity of the research results.



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