



**College of Business and Economics
(CBE)**

DEPARTMENT OF ECONOMICS

GIKONDO CAMPUS

MASTERS IN ECONOMICS

ACADEMIC YEAR 2014-2016

MASTERS THESIS

**TOPIC: Employment in Manufacturing and Service
Firms in Rwanda**

A dissertation submitted in partial fulfillment of the requirements for the degree of masters in economics

Prepared by: MUHIRE Barham:

Reg. N°: 215033683

SUPERVISOR: Prof Almas HESHIMATI

Kigali, July 2017

Declaration

This research study is my original work and has not been presented for award of Master's Degree to any other institution. No part of this research should be reproduced without my consent or that of the University of Rwanda (UR), College of Business and Economics (CBE), Gikondo Campus.

Barham MUHIRE

Date.....

Signature.....

This Masters dissertation has been submitted for examination with my approval of supervisor

Prof. Almas HESHMATI

Certification

It is certified that the thesis entitled “Employment in Manufacturing and Service Firms in Rwanda” is a genuine work of MUHIRE Barham a student of MSc, in College of Business and Economics under my supervision.

This work is submitted in partial fulfillment of the requirements for the award of the degree of masters in Economics.

Date.....

Signature.....

Supervisor,

Prof Almas HESHIMATI

Dedication

This work is dedicated to;

To my elder brother Johnson Bosco RUKUNDO for the full support, my parents, and other family members for their encouragement, advices and unconditional love they have for me.

To all friends, classmates.

Acknowledgement

First and foremost, I would like to thank the almighty God for his ongoing helpful, protection of my life during the period of my studies.

The role of my supervisor prof. Almas HESHMATI in providing and supporting valuable insights and orientation throughout to this study is greatly appreciated.

I would like to extend my sincere thanks to my family, relatives, friends, classmates and others volunteers for tireless efforts and support in guiding, helping and supporting me with all necessary advice.

Thanks to all staffs of Collage of Business and Economics (CBE), Department of Economics, University of Rwanda (UR), Gikondo Campus.

Table of contents

Declaration.....	ii
Certification	iii
Dedication.....	iv
Acknowledgement	v
Table of contents.....	vi
List of tables.....	vii
List of figures.....	vii
List of Abbreviations	viii
Abstract.....	ix
CHAPTER ONE: GENERAL INTRODUCTION	1
1.1 Introduction.....	1
1.2 Problem Statement	3
CHAPTER TWO: LITERATURE REVIEW	4
2.1 Growth and development of the manufacturing and service sectors	5
2.2 The manufacturing and service sector’s contributions to the economy	6
2.3 Determinant factors of growth of the manufacturing and service sectors.....	9
CHAPTER THREE: THEORETICAL FRAMEWORK.....	11
3.1 Understanding the key concepts	12
3.2 Development of manufacturing and services by economic activity	13
3.3 Rwanda GDP at current prices in US Dollars.....	14
3.4 Rwandan labor market and regulations.....	16
3.5 Wages in Rwandan manufacturing and service firms	17
CHAPTER FOUR: METHODOLOGY.....	20
4.1 Description of the Data	20
4.2 Estimation method: linear regression model.....	21
4.3. The Empirical Model’s Specifications, Estimation and Testing.....	21
4.4 The empirical model and its specifications.....	22
CHAPTER FIVE: DATA PRESENTATION, ANALYSIS OF RESULTS AND INTERPRETATION	25
5.1 Empirical findings in employment research	25
5.2. Estimation and testing.....	25
CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS	31

6.1. Usefulness of Results and policy Recommendations.....	31
6.2 Policy Recommendations.....	32
Summary and Conclusions	33
References.....	35

List of tables

Table 1: Variables and their explanations.....	20
Table 2: Tobit model Generalized (Manufacturing and service firms)	40
Table 3: Linear regression (model 1) Manufacturing and Service and its determinants	41
Table 4: Linear regression (model 2) Manufacturing sector and its determinants	42
Table 5: Linear regression (model 3) Services sector and its determinants	43
Table 6: Linear regression (model 3) Manufacturing and Services sector	44
Table 7: Appendix 1. Correlation matrix of manufacturing and service firms, N=174.....	45
Table 8: Appendix 2. Descriptive statistics of determinants of employment	46
Table 9: Appendix 3. NESTED model of Manufacturing and service sector	47

List of figures

Figure 1: Rwanda's GDP in current prices in US Dollars	15
Figure 2: Gross Domestic Product, Constant prices, Rwanda, 1990-2014.....	15

List of Abbreviations

CBE - Collage of Business and Economics

EAC - East African Community

ES - Enterprise Survey

FDI - Foreign Direct Investment

GDP - Gross Domestic Product

HCID - Human Capital and Institutional Development

ICT - Information and Communication Technology

ILO – International Labor Organization

ISIC - International Standards Industrial Classification

LDCs - Less Developed Countries

LRM - Linear Regression Model

MINECOFIN -Ministry of Finance and Economic Planning

NISR - National Institute Statistics of Rwanda.

OECD - Organization for Economic Cooperation and Development

OLS - Ordinary Least Squares

RDB - Rwanda Development Board

SEZ - Special Economic Zone

SSA - Sub Saharan African

UNECA - United Nations Economic Commission for Africa

UR - University of Rwanda

W.B - World Bank

Abstract

Employment in manufacturing and service firm is an avenue for economic transformation as not all countries have a competitive edge in manufacturing and services. This paper analyses employment and its determinants in the manufacturing and service sector in Rwanda. As the growing economy in East Africa, it is very important for Rwanda to have good and quality employment in both manufacturing and service sector as it will have a great impact for economic growth and standard welfare. The paper also provides the practitioners with a better understanding of the employment in manufacturing and service sector in Rwanda. Using the World Bank's Enterprise survey's database for 2011, we find that the firm size, Number of establishment that form firm, wages and social payments, and Research and development are statistically significance on the employment in manufacturing and service firms at the level of 0.05 per cent confidence interval. These factors can be used in forming public policy with the aim of using the manufacturing and service firms as an engine for speeding up the shift from a low income to a middle income state as the Rwanda economy is heading. The location of the firm, Age square, manager's experience, female experience, national sales and research and development had a positive but insignificant impact on employment in both manufacturing and service sector. And on the basis of these observations we make a number of policy and recommendations to promote the quality of employment.

Key words: formal employment, growth, development, manufacturing and services, Rwanda.

JEL Classification Codes: A10, D13, F01, J21, O12, O55.

CHAPTER ONE: GENERAL INTRODUCTION

1.1 Introduction

Informal sector refers to the sector which encompasses all jobs that are not recognized as normal or legal income sources, and on which employer and income taxes are not paid. While formal sector is sector which encompasses all jobs with normal hours and regular wages, and are recognized as income sources on which income taxes must be paid. This study investigates how this influences economic development, i.e. increase in real output per capita and reduction in poverty. There are two types of informal sector activities that can be described as follows. First; coping strategies (survival activities): these include casual jobs, temporary jobs, unpaid jobs, and subsistence agriculture to mention but few. Second, unofficial earning strategies (illegality in business): these unofficial business activities include; tax evasion, avoidance of labor regulation and other government or institutional regulation of the company. Underground activities: Crimes, corruption, activities not registered by statistical offices are not considered here.

The pace of globalization of employment in manufacturing and service firms is much more rapid and the employment in manufacturing and services is conceived as an avenue for economic transformation, as not all countries have a competitive edge in manufacturing (UNECA, 2015). The Rwandan employment is sub-divided into two categories of formal and informal employment in manufacturing and services.

Many researchers in economics have argued that the employment in manufacturing and service firms has great implications for the growth and development of a country's economy. Among others, Wu (2007), Shingal (2013, 2014) and Singh, and Kaur (2014) have claimed that India and China have recorded attractive economic growth that is closely associated with the dramatic development of the service sector.

Within the competitive global village, the Rwandan economy has annually recorded 8 per cent average GDP (Gross Domestic Product) growth since 2001 and GDP per capita increased more than three-fold from about US\$211 per capita in 2001 to US\$718 in 2014. The service sector spearhead this strong economic growth journey as it accounted for a bigger share of GDP by 2015, 47 per cent of GDP compared to 33 per cent of the primary sector (agriculture, forestry and fishery)

while the growth of manufacturing and service firms was impressive at around 9 per cent by 2014 against 7 per cent for industry and 4 per cent for agriculture. The main sub-sector in the service sectors are wholesale and trade, transportation, storage and communication services. Trade and transport services contributed to the share of services in GDP at 159 billion Rwf in 1999 which increased to 784 billion Rwf in 2014 of which wholesale and retail trade had 615 billion Rwf in 2014.

Rwanda was ranked second after Mauritius in doing business in sub-Saharan African (SSA) countries in 2013-2014; the service sector received a big share of foreign private investments. As a result 41.4 per cent of foreign private investments were allocated to information and communication technology (ICT) and tourism (12.8 per cent), while others like mining received 13.8 per cent, manufacturing (10.8 per cent) and other sectors received a significant (21.7 per cent) share of private investments. Meanwhile, as is documented in the Rwandan Vision 2020, the manufacturing and service is believed to be the engine for Rwanda's economic development with a growth rate of 13.5 per cent and a contribution of 42 per cent to GDP.

Empirically, the present study aims at analyzing the development of employment in manufacturing and service firms and its determinants in Rwanda. Thus, the prime purpose of the study is to conduct an analysis of trends in the expansion of manufacturing and service firms in Rwanda and pointing out the contributing factors driving its development using survey data covering various parts of employment in manufacturing and service firms. Findings can be used to initiate additional academic research; they also contribute to the body of knowledge about the role of the employment in manufacturing and service firms in economic growth in developing countries of which Rwanda is classified as one. Further, it sheds light on Rwanda's ambitious target as listed in its Vision 2020 as contributing to holistically understanding what to concentrate on considering the employment in manufacturing and service firms for the economic growth of a country. This research contributes to better understanding of the employment conditions in Rwanda and how a different sector of the economy contributes to the national development and progress.

This paper is structured as follows: The next two sections review literature on the employment in manufacturing and service firm's development internationally and nationally in Rwanda in particular. The next section details the conceptual framework and specifies and estimates the

model to be used. The section that follows describes the data and the methodology for empirically analyzing the employment in manufacturing and service in Rwanda. The next section is to present the empirical model, specifications, estimations and testing. In another section points out the usefulness of the results and provides policy and recommendations. The last section is a summary of the findings and a conclusion and provides suggestions for future data collection and research.

1.2 Problem Statement

Manufacturing and Service firms both formally and informality face many similar issues that affect the end results of the operation in manufacturing and service sector. Despite an abundance of obstacles, the biggest challenge facing the manufacturing sector is a lack of skilled trained labor and technology. The manufacturing sector has been beleaguered by obstacles where nearly every news outlet has covered the closing of manufacturing industries, labor disputes between manufacturing firms and their employees or reductions in force due to the shift of labor off shore. The reputation of manufacturing firm has been marred by low wages and less than desirable working conditions.

CHAPTER TWO: LITERATURE REVIEW

A literature review shows that a number of researchers and international organizations have supported the role of employment in manufacturing and service firms as a key driver in the growth of an economy in both developed and developing countries. Recently, the United Nations Economic Commission for Africa (UNECA) affirmed that the employment in manufacturing and service firms as an avenue for economic transformation as not all countries have a competitive edge in the manufacturing firm (UNECA, 2015). The employment in manufacturing and service firm's development is also providing an infrastructure which will promotes productivity in manufacturing and agriculture sectors.

The service sector is expanding very rapidly. The extraordinary growth of the service sector has focused attention on challenges of effective management of service organization and operations vastly different from the challenges faced in manufacturing settings. Due to rapid development in information technology, globalization, changing customer needs or preference, and the changes in relative wealth between the developed and newly developing economies, the effective management of service systems addressing productivity and quality issues will become even more important in the coming years.

In particular two reviews (Knight, 1999; Bryson, 2001) and four opinion-based conceptual papers (Lovelock, 1999; Grönroos 1999; Clark & Rajaratnam, 1999, Samiee, 1999) state that the status of professional services' internationalization before the twenty-first century. Both Knight (1999) and Bryson (2001) ask for more conceptual research and theory building on services internationalization. One major point that is evident I literature is the lack of common services classification. Knight (1999) and Bryson (2001) stress the need for clear definitions and taxonomies in order to be able to discuss similarities and differences between theories and conceptualizations. Samiee (1999) points out that this absence of consensus prevents effective genetic theory building. One reason for this gap is the fact that there seems to be larger differences in between service industries than between service and manufacturing in general (Nachum, & Keeble, D, 1999).

2.1 Growth and development of the manufacturing and service sectors

The service sector's economic development is the only way of promoting economic structural adjustment and accelerating the transformation of economic growth (Zhou, 2015). A declining share of agricultural employment is a key feature in economic development (Alvarez-Cuadrado and Poschke, 2011). Structural formation usually coincides with a growing role of industry and services in the economy (UNECA, 2015). The growing size of the service sector and its impact on the other parts of the economy makes it all the more important to promote efficiency in the provision of services and thereby boosting economy-wide labor productivity as witnessed in Organization for Economic Cooperation and Development (OECD) member countries. The slowdown in the service sector has brought down labor productivity in the entire economy from more than 4 per cent in 1976-89 to less than 2 per cent in 1999-2004 (Jones, and Yoon, 2008). Acharya and Patel (2015) confirm that the service sector is the fastest growing sector in India, contributing significantly to GDP, economic growth, trade and foreign direct investment (FDI) inflows as the total share of this sector to India's GDP is around 65 per cent.

According to Park and Shin (2012), a general wisdom is that when a country industrializes the share of industry and service sectors in both GDP and employment rise whereas the share of agriculture falls and when a country de-industrializes and moves into the post-industrial phase, the share of services rises while the shares of both industry and agriculture fall. They found that when computing the contribution of agriculture, industry and services to GDP growth, in general the service sector made the biggest contribution. Further, the lower the per capita GDP, the greater the scope for labor productivity growth in the service sector, which implies that there is still a lot of room for the increased growth in the productivity of services.

The literature is comprehensive, but Hopenhayn (1992) provides a relatively tractable formulation of it. In his model, firms differ only in terms of their productivity levels, each of which evolves according to an exogenous Markov process. New firms enter when the distribution from which they draw their initial productivity level is sufficiently favorable that their expected future profit stream, net of fixed costs, will cover the sunk costs of entry. Firms exit when they experience a series of adverse productivity shocks, driving their expected future operating profits sufficiently

low that exit is their least costly option. All firms are price takers, but the prices of their inputs and outputs depend upon the number of active firms and their productivity levels.

This model shares a number of implications with other representations of industrial evolution developed by Jovanovic (1982) and Ericson and Pakes (1995). At any point in time, an entire distribution of firms with different sizes, ages, and productivity levels coexists, and simultaneous entry and exit is the norm. Young firms have not yet survived a shakedown process, so they tend to be smaller and to exit more frequently. Large firms are most efficient, on average, so their mark-ups are the largest. Nonetheless, despite all the heterogeneity, equilibria in both Jovanovic's and Hopenhayn's models maximize the net discounted value of social surplus. Thus market interventions like artificial entry barriers, severance laws, or policies that prop up dying firms generally make matters worse.

2.2 The manufacturing and service sector's contributions to the economy

The rapid expansion of the service sector is principal to the contemporary global economic restructuring. This is proven by the fact that the increase in the service sector's share in the global workforce from 24 per cent to 35 per cent between 1965 and 1990 led to its share in the world's domestic products increasing from 50.6 per cent to 62.4 per cent between 1960 and 1990 (Berentsen, 1996).

Olofin, Olufolaham and Jooda (2015) have argued that in West African 60-65 per cent of the population is still engaged in farming and many are still food insecure. Research confirms a positive relationship between income growth and food security and researchers recommend putting in place policies and programs to ensure quality civil services. However, despite this in sub-Saharan Africa the service sector makes up nearly 60 per cent of GDP and is expected to grow as historical data shows that each 15 per cent increase in services' contribution to GDP is associated with a doubling of incomes per capita. The top ten African countries by services share as reported by UNECA (2015) are Seychelles (81.1 per cent), Djibouti (77.0 per cent), Mauritius (71.5 per cent), Cape Verde (70.3 per cent), South Africa (69.1 per cent), Botswana (61.8 per cent), Senegal (60.1 per cent), Eritrea (60.0 per cent), Lesotho (60.0 per cent) and Gambia (60.0 per cent) share of service sector in its GDP. In the European region, Maroto-Sanchez and Cuadra-Ruara (2011)

confirm that several service industries have shown dynamic productivity growth rates, contributing more than expected to productivity growth.

UNECA (2015) has documented the performance of Rwanda in the service sector which shows that service exports grew from \$59 million in 2000 to 395 million in 2011. A growth of more than 10 per cent occurred in wholesale and retail trade, education, finance and insurance, and transport, storage and communications since 2007. Over 2000 and 2011, the ICT sub-sector received investments amounting to \$552 million, exports of travel services were equivalent to 63 per cent of merchandise and service's exports in 2011. By 2011, FDI stocks in services were the largest at \$640.2 million followed by \$90.8 million in manufacturing. In the seven year government program, tourist is expected to grow at a compound annual rate of 25 per cent and by 2014 Rwanda had received 1,137,000 visitors mostly attracted by the Rwanda mountain gorilla, generating \$294 million (up from \$62 million in 2000). In addition, the government is committed to increasing investments in services up to \$350 million by 2016 from \$46 million in 2015.

Employment and income distribution, increasingly, income distribution is being regarded as an essential dimension of national welfare and development (Jarvis, 1974), a view which we share, let no one be misled. However, the reorientation of development strategies toward a fuller utilization of labor along the lines sketched above will not automatically settle problems of income distribution will not automatically ensure that those who are able will have an opportunity to use their capacities in production. Participation in the distribution of the benefits of growth does not necessarily mean participation in the production of those benefits. But the two are related and that relationship merits briefs exploration if only to ensure that neither is accepted as a proxy for the other in the design of development strategies.

The manufacturing sector is often the darling of policy makers in less developed countries (LDCs). It is viewed as the leading edge of modernization and skilled job creation, as well as a fundamental source of various positive spillovers. Accordingly, although many LDCs have scaled back trade barriers over the past twenty years, the industrial sector remains relatively protected in the typical country (Schiff, and Valdez 1992, ch.2; Erzan et al. 1989; Ng, 1996). Governments also promote manufacturing with special tax concessions and relatively low tariff rates for importers of manufacturing machinery and equipment.

Chenery (1961) and Kasper (1978) found the secular view as the resources allocate because the change in income and taste of society, as the income increased the primary goods demand fall so that the percentage of spending of income fall on primary products. However the secondary and tertiary sector developed in this stage at the cost of primary sector. The structural change in Bacon-Eltis appeared for the reason that rapid growth of public sector and the resources are shifted from services sector because government biasness toward services.

The private output growth, there is some evidence of spatial spillovers in other countries. Pereira and Roca-Sagalés (2003) estimate a 5.5 percent rate of return to public capital at the national level in Spain, and a significantly positive return in 14 out of 17 Spanish regions. Similar to Munnell (1992) findings about the US, they also find that the sum of regional estimates (based on within-region stocks on infrastructure) account for less than half of the total effect of public capital, as estimated at the national level.

The service can be thought of as an entire industry which is not concerned with the production of manufactured goods. The service industry as a whole comprises distinct segments such as financial services or telecommunications, which are all different (Lovelock, 1983). Economists brought about this perspective for the purpose of classifying and reporting those activities in national statistics (Johns 1999). From a management perspective, however, industry based classification schemes are of little help since they overlook the fact that service operations characteristics often vary considerably within specific industries and even within organizations.

A service can be seen as an outcome, “what the customer receives” (Mohr and Bitner 1995, p. 239). It has been well documented that service outcomes share four specific attributes, often referred to as IHIP, that distinguish them from manufactured goods: intangibility, heterogeneity (variability), inseparability of production and consumption, and perishability (Sasser, Olsen, and Wyckoff 1978; Zeithaml, Parasuraman, and Berry 1985). Although these characteristics are often regarded as the core paradigm in services marketing (Lovelock and Gummesson 2004) their validity has been subject to heavy criticism (Johns, 1999; Lockyer, 1986; Lovelock and Gummesson 2004; Sampson and Froehle 2006; Vargo and Lusch 2004).

Service can be described as a process (Fisk, Brown, and Bitner 1993), “the manner in which the outcome is transferred to the customer” (Mohr and Bitner 1995, p. 239). Shostack (1987) claims that services are processes, “series of interactions between participants, processes and physical elements” (Tax and Stuart 1997, p.107). As a result of the well- accepted view that manufacturing and service processes are differentiated by the extent of customer influence on the production process, it would seem that service operations research has been biased towards service environments characterized by a high degree of customer contact (Slack, Lewis and Bates 2004).

2.3 Determinant factors of growth of the manufacturing and service sectors

Increasingly, contemporary literature on economic growth in economies across countries underlines factors that contribute to the remarkable growth in the service sector. These factors include but are not limited to increasing foreign direct investments, openness of a country’s economy, and expansion of skill development, quality health services, applying information technology and increasing consumption expenditure.

In terms of income levels and business environment, the countries typically labeled developing are a very heterogeneous group. By the World Bank’s reckoning they currently span the per capita income range from \$US 8,380 (Argentina). Nonetheless, looking across countries, some distinctive features of the business environment become increasingly evident as one moves down the per capita income scale. At the risk of over simplifying, this study will begin by mentioning the most striking and widely acknowledged among them.

The market size in some developing economies is quite large, while most are not. Hence, expecting countries like Brazil, China, India and Indonesia, the size of the domestic market for manufactured products is relatively limited. Further, among the least developed countries, Engel effects (Tybout, 1998) favor basic subsistence needs over all but the most basic manufactured products so when transport costs are significant and the OCDE countries are distant, demand for the more sophisticated manufactured goods is small.

Accesses to manufactured inputs have the menu of domestically produced intermediate inputs and capital equipment is also often limited in developing countries. Thus producers who might easily have acquired specialized inputs if they were operating in an OCDE country must either produce

with imperfect substitutes or import the needed inputs at extra expense. This latter option is the dominant choice among smaller countries.

Human capital have low rates of secondary education and a scarcity of technicians and scientists also affect the mix of goods manufactured and the factor proportions used to produce them. Similarly, many have argued that flexibility in production processes and the ability to absorb new technologies are directly related to the stock of domestic human capital (e.g., Nelson and Phelps 1996; Evenson and Westphal 1995; Keller, 1996).

Infrastructure like roads, ports, airports, communication facilities, power, and water access tend to be relatively limited in LDCs. Production techniques are directly affected, as are the costs of servicing distant markets. Poor transportation networks are particularly limiting in the least developed, more agrarian economies, where consumers are spread throughout the countryside. In instances where infrastructure services are missing or unreliable, some firms must produce their own power, transport, and communication services.

CHAPTER THREE: THEORETICAL FRAMEWORK

Rwandan Manufacturing and Service Sectors

The Rwandan economy is based largely on rain-fed agricultural production of small, semi-subsistence and increasingly fragmented farms. The country's population is over increasing. However, the increase in population steadily weakens the poor households which depend solely on agriculture for their live hoods as more Rwandans are cultivators. Manufacturing sector is growing at high rate. We have created the special economic zone where all manufacturing industries are located and the main service sub-sector and contributors to the growth of the service sector were tourism, transport, banking service, telecommunication and others.

According to the report from ministry of finance and economic planning (MINECOFIN) 2013/2014, the manufacturing sector is growing at high rate due to the process of facilitating made in Rwanda and in this year national budget where it is in the priority. 2017/2018 Budget lays the ground for key areas for infrastructure development and promotion of made in Rwanda products, manufacturing schemes of Rwanda.

The 1994 genocide decimated Rwanda's fragile economic base, severely impoverished the population, particularly women, and temporarily stalled the country's ability to attract private and external investment. However, Rwanda has made substantial progress in stabilizing and rehabilitating its economy to pre-1994 levels. GDP has rebounded with an average annual growth of 7-8 per cent since 2003 and inflation has been reduced to single digits. Nonetheless, in 2015, 39 per cent of the population lived below the poverty line, according to government statistics, compared to 57 per cent in 2006.

Rwanda is land locked country and located in east Africa and is part of east African community (EAC). Rwanda joined east African community in aligning its budget, trade, immigration policies with its regional partners. Through manufacturing and service firms, the government of Rwanda is seeking to become a regional leader in information and communication technologies. The government has embraced an expansionary fiscal policy to reduce poverty by through encouraging manufacturing and service sectors to improve the standards of living for people in different fields like education, infrastructure, foreign and direct investment and pursuing market oriented reforms.

In 2012, Rwanda completed the first modern special economic zone (SEZ) in Kigali as industrial zone area. The SEZ seeks to attract investment in all sectors, but specifically in agribusiness, information and communications trade and logistics, mining and construction. Rwanda economic statistics with African Business Development, 2014).

In the second quarter of 2016, Rwanda's Gross domestic product (GDP) at current market prices was estimated to be Rwf 1,549 billion, up from Rwf 1,428 billion in the same quarter of 2015. The Services sector contributed 48 per cent of GDP while the agriculture sector contributed 33 per cent of the GDP. The industry sector contributed 13 per cent of the GDP and 6 per cent was attributed to adjustment for taxes and subsidies on products. In 2016 Q2, estimates calculated in 2011 prices shows that GDP was 5.4 per cent higher in real terms compared to the same quarter of 2015. In this quarter, “agriculture sector” grew by 3 per cent and contributed 0.9 percentage points to the overall GDP growth. Activities in the “industry sector” decreased by 2 per cent and contributed negative 0.3 percentage points. “Service sector” increased by 9 per cent and contributed 4.4 percentage points to the overall GDP. (NISR 2016).

3.1 Understanding the key concepts

Employment in this conceptualized study as the manufacturing and service firms in economic activities of the firms operating in the Rwandan economy. National accounting of GDP complies with the International Standards Industrial Classification (ISIC) of all economic activities. Employment is conceptualized as people at work, persons involved in the production of goods and services. As the production requires, working time and human capital, firms and other organizations pay people, providing them with a key component of their income. Particularly low national employment rates may signal a long lasting depression and underdevelopment. The kind of job of a person is one of the determinants of the belonging to social groups.

Growth is conceptualized as the formal sector measured as GDP. King, and Levine (1993), the financial development is robustly correlated to the future rate of economic growth, accumulation of physical capital and improvement in economic efficiency. Growth in foreign sales contributions to a firm's growth if there is greater interaction among the management team's members and a higher degree of joint decision making among the owners and managers of small manufacturing

and service firms (Reuber and Fischer, 2002). Sustaining economic growth and improving living standards requires shifting labor into both the manufacturing and service firms (Eichengreen and Gupta, 2011).

A firm's growth is conceived as an increase in the product or service of the manufacturing and service firms as the main business to increase in of sales of the products, increase in the number of new employed persons and the size of the established employment. Smith et al. (2006) found that the proportion of women in top management jobs had a positive effect on a firm's performance and that its effect depended on qualification of female top managers in Denmark. Dawkins, Feeny, and Harris (2007) have argued that both a large firms and those which are highly specialized, enjoy higher profit margins, whereas the more capital intensive the firms lower its profitability.

3.2 Development of manufacturing and services by economic activity

The distribution of business by economic activity in Rwanda shows that the manufacturing and service sector achieved positive growth in both rural and urban areas. The main sub-sectors in the service sector that showed more than 30 per cent growth include accommodation and food services, human health and social work activities and art, entertainment and recreation activities. According to Singh, and Kaur (2014) rapid urbanization is a key factor which contributes to the growth of manufacturing and service sector and leads us to analyze this growth of the service sector in urban and rural areas in 2011-2014.

According to National Institution Statistics or Rwanda (NISR, 2014) shows that the service sector has grown at greater rate. The average growth of service sector (accommodation and food) as sub sector was 34 per cent between 2011 and 2014 in private establishments and the business oriented mixed sector by the economic activity. It is obvious that both accommodation and food services as sub sectors are growing fast in rural areas than in urban areas and the growth of this sub sector contributed to the overall of the service sector.

Overall, Rwanda's economy grew at 7.5 per cent in 2010, 2 per cent higher than the East African Community and even more than sub-Saharan African. During 2010 the service and industrial sectors progressed in their growth recovery. Compared to most other African countries, manufacturing in Rwanda is small and includes firms with very different capabilities: small firms

that cater for the local markets and more modern large firms some of which export. The share of manufacturing fell from 12 per cent in 1997 to 6.7 per cent in 2010. However, in the period 2006 to 2009, this share was 6.8, 6.1, and 6.4 per cent, respectively. In the period 2000-2006, the share of employment in manufacturing increased from 1.7 per cent to 3.3 per cent to total employment. NISR, EICV, 2005-2006 (labor market and economic activity trends in Rwanda).

The Rwanda Development Board's (RDB) mandate is to promote private sector development through investment promotion. In order to attract the requisite investment, it is important to ensure that the country has the right quantity and quality of skills to support the emerging and growing industries. The Human Capital and Institutional Development (HCID) Department at RDB supports the private sector by developing mechanisms to ensure there is adequate and availability skills with the right quality. The figures shows that the size distribution of firms (including manufacturing, construction and mining) from the establishment census across five categories of size. If we consider all manufacturing firms with more than ten employees (small, medium, large industries), there are a total of 325 in Rwanda. (Rwanda Industrial Survey, 2011).

3.3 Rwanda GDP at current prices in US Dollars

The Gross Domestic Product (GDP) measures of national income and output for a given country's economy. The gross domestic product (GDP) is equal to the total expenditure for all final goods and services produced within the country in a stipulated period of time.

The Gross Domestic Product (GDP) in Rwanda was worth 8.10 billion US dollars in 2015. The GDP value of Rwanda represents 0.01 percent of the world economy. GDP in Rwanda averaged 2.03 USD Billion from 1960 until 2015, reaching an all-time high of 8.10 USD Billion in 2015 and record low of 0.12 USD Billion in 1961.

From 2006 -2016, Rwanda's GDP in current prices in USD billions increased at high rate. Since Rwanda is looking in going forward in development, the private sector which is still largely informal, will have to play a bigger role in ensuring economic growth. Poor infrastructure and lack of access to electricity and some major constraints to private investment. As Rwanda's investment relies significantly on foreign aid, stable inflows of this foreign aid are critical to keep the current high investment rate at around 25 percent of GDP.

Figure 1: Rwanda’s GDP in current prices in US Dollars



Source: Trading economics/ World Bank

Figure 2: Gross Domestic Product, Constant prices, Rwanda, 1990-2014.



Source: International Monetary Fund, World Economic Outlook Database April 2015.

The annual percentages of constant prices GDP are year on year changes; the base year is country specific. The GDP at constant prices, the price were changing at the percentage change. From 1980-1988, the prices were at the percentage of 18. But from 1988-1992, the prices started slightly changing to below zero (0). In 1992-1994, there was economic down fall due to 1994 Genocide that happened in Rwanda. Prices went to negatives approximately (- 40) and this lead the economy into difficulties. After Rwandan Genocide in 1994, that is in 1994-1995 the economy started to grow from almost zero with the support of internal and external donors to support the Rwandan economy. From 1995-2014 there have been some changes in the economy with the support of different sources of funds. Including African Development Bank, World Bank, IMF, and revenues inside the country.

3.4 Rwandan labor market and regulations

This section analyses employment outcomes in manufacturing and service firms in Rwanda and how these vary for women and men and for youth employment rates, the extent and size of employment, the skills status of employed people, and the earnings of those paid employments both in manufacturing and service firms. Using current International Labor Organization (ILO) definitions, only 4.1 per cent of working age youth, individuals between the age of 16 to 35, are considered unemployed. (Youth employment in Rwanda. A scoping Paper. Laterite 2015).

Many of individuals who are engaged in subsistence agriculture or need to work in multiple jobs in order to earn a living condition. But the most pressing challenge faced by the youth is that of unemployment where the two thirds of youth work less than 35 hours per week, and the threshold for underemployment in Rwanda. Their wages are significantly lower than adult workers, and a higher share of the youth population are employed in informal employment jobs. The new program of made in Rwanda in manufacturing sector, has reduced the rate of unemployment in Rwanda.

Labor law from 2009 regulates labor in Rwanda. It establishes fundamental rights at work, regulates various aspects of employment, general working conditions, salaried formal sector workers, leaves, occupational safety and health, organization of workers and employers, collective agreements and labor disputes. The law also establishes the labor inspectorate, the Ministerial Labor Directorate and the National Labor Council. According to the law workers representatives

are to be elected in firms employing at least ten workers. Workplace elections are supposed to be conducted in November 2014. (Law No 13/2009 of 27 May 2009 regulating labor in Rwanda.

3.5 Wages in Rwandan manufacturing and service firms

The Wage Indicator Data Report (Besamusca, J., Tijdens, K.G., Ngeh Tingum, E., Mbassana E.M. (2012) represents the results of the face to face wage indicator survey in Rwanda, conducted between the 27th of October and the 3rd of December 2nd 2012. The survey aimed to measure in detail the wages earned by Rwandan workers. In total 2074 persons were interviewed in towns in all provinces of Rwanda. The workers lived in households with on average 4 members, including themselves. Almost half of the workers live with a partner and children. Some 4 per cent of workers followed no formal education, two in ten stopped at elementary education, 44 per cent completed secondary education. 6 per cent followed post-secondary education and 26 per cent followed tertiary education. On a scale from 1=dissatisfied to 10=satisfied, workers rate their satisfaction with life as a whole a 5.9 on average.

In the sample, 29 per cent of the workers were self-employed, 24 per cent were employees on permanent contracts, and 24 per cent had fixed-term contracts, whereas 23 per cent had no contract at all. On average, the workers had worked for 9.5 years. Over half of the people worked in an organization with 10 or fewer employees, one in three worked in an organization with 11-50 employees, 7 per cent work in businesses of 51 to 100 employees and 11 per cent work for businesses employing over a 100 people. Up to 55 per cent of workers in the sample report being employed as managers (this group includes all business owners, including micro-enterprises), 12 per cent are services and sales workers, and 11 per cent work in elementary occupations and 10 per cent as clerical support workers.

Over four in ten respondents work in trade transport and hospitality, 27 per cent in agriculture, manufacturing and construction, 18 per cent in the public sector and 15 per cent work in commercial services. On average, the respondents work 60 hours per week and 5.9 days. Some 42 per cent of workers report working shifts, 39 per cent work evenings, 56 per cent works Saturdays, while 36 per cent works Sundays. Some 39 per cent state that they are entitled to social security, whereas 46 per cent contribute to social security. Less than two in ten workers state that they have

no agreed working hours, 60 per cent has agreed hours in writing and 22 per cent verbally agreed hours. Up to 82 per cent of workers report receiving their wage on time; 53 per cent of workers received wages in a bank account, 46 per cent cash in hand and 1 per cent in kind. On a 5-point informality-index, ranging from 1= very informal to 5= very formal, 39 per cent of workers are in the lowest category in the index, whereas 18 per cent are in the highest category. The Wage Indicator Data Report 2012. (Besamusca, J., K. Tijdens., E. Ngeh Tingum., E.M. Mbassana. Wage Indicator survey 2012, Pp.13).

The median net hourly wage of the total sample is 450 Rwandan francs (Rwf). About:- 26 per cent of workers earn less than 150 francs per hour, another 24 per cent earn between 150 and 450 francs, 29 per cent earn between 450 and 1,350 francs and the remaining 21 per cent earn more than 1,350 francs per hour. Employees with permanent contracts have by far the highest earnings (1,008 Rwf), whereas workers without contracts (128 Rwf) have the lowest earnings. At 565 francs, employees on fixed term contracts earn above average wages, whereas the self-employed fall below it (418 Rwf). Managers have the highest median wages (722 Rwf). The lowest paid workers are skill service and sales workers (128 RWF) and workers in elementary occupations (139 Rwf). The highest wages are earned in agriculture, manufacturing and construction (667 Rwf), the lowest in commercial services (202 Rwf). At 270 Rwf, workers in firms with less than ten employees earn the lowest wages, whereas employees in firms of over a 100 employees earn the highest wages (1,210 Rwf). Those on the lowest end of the informality index earn only 192 Rwf per hour, whereas those in the highest category earn wages 1,155 francs. Men have slightly higher wages compared to women, and young workers have substantial lower wages than workers in the oldest age group. Workers with tertiary education earned 1369 Rwf, compared to 98 Rwf for workers without education. (Besamusca, J., K. Tijdens., E. Ngeh Tingum., E.M. Mbassana. Wage Indicator survey 2012, Pp.11).

Only 49 per cent of the sample is paid on or above the poverty line of 118,000 Rwf per month. Workers without contracts were most vulnerable; just one in ten earn on or above the poverty line. In contrast, 79 per cent of employees with permanent contracts, 57 per cent of workers on fixed term contracts and 44 per cent of self-employed do. Workers in firms employing between 51 and 100 people are most often paid above the poverty line (86 per cent), compared to only 35 per cent of workers in firms employing 10 people or less. Only 26 per cent of the most informal workers

are paid on or above the poverty line, compared to 84 per cent of the most formal workers. Men are slightly more likely to be paid above the poverty line than women (52 per cent versus 47 per cent). The older workers are, the more likely they are to be paid above the poverty line. Workers with tertiary education are paid on or above the poverty line in 92 per cent of the cases, compared to just 15 per cent of workers without formal education. Up to 63 per cent of managers are paid above the poverty line, whereas only 14 per cent of workers in elementary occupations and 19 per cent of services and sales workers are. Workers in commercial services are most at risk of being paid poverty wages, while workers in agriculture, manufacturing and construction are most likely to be paid on or above the poverty line. (Besamusca, J., K. Tijdens., E. Ngeh Tingum., E.M. Mbassana. Wage Indicator survey 2012, Pp.16).

Despite the fact that over the several decades millions more women have joined the workforce and made huge gains in their education attainment. Too often it is assumed that this pay gap is not evidence of discrimination, but is instead a statistical artifact of failing to adjust for factors that could drive earnings differences between men and women are themselves often affected by gender bias. Those keen on downplaying the gender wage gap claim women voluntarily choose lower pay by disproportionately going into stereotypically female professions or by seeking out lower paid positions. However, leaving women in their current occupations and just closing the gap between women and their male counterparts within occupations (e.g., if male and female civil engineers made the same per hour) would close 68 percent of the gap. This means examining why waiters and waitresses, for example, with the same education and work experience do not make the same amount per hour.

CHAPTER FOUR: METHODOLOGY

4.1 Description of the Data

The data used in this study are from the World Bank's enterprise survey (ES). As part of these surveys the World Bank collects data from key manufacturing and service sectors in every region of the world. The surveys use standardized survey instruments and a uniform sampling methodology to minimize measurement errors and to yield data that are comparable across the world's economies and as such are suitable for comparative economic studies. The initial dataset consisted of 174 firm level observations in Rwanda's manufacturing and service sectors in 2011.

The enterprise survey covers many factors which shape the business environment and is useful to both policy makers and researchers. The Enterprise survey is conducted by the World Bank and its partners across all geographic regions and covers small, medium and large companies. The sample is consistently defined in all countries and includes the entire manufacturing firm, the service sector and transportation and construction. The 2011 Rwanda Enterprise survey covered 174 firms including 55 manufacturing firms and 119 service firms.

The model of employment in manufacturing and service firms, uses employment as the dependent variable which its variations across firms is explained by a set of independent variables presented in Table 1.

Table 1: Variables and their explanations

Employment	Dependent variable
Establishment part of large firm	The establishment of the firm both manufacturing and service
Firm size	Establishment of the firm is categorized in three large, medium and small
Number of establishment that form firm	The number of firms that were established
Age	Age is the number of years the firm has been established
Formally registered	The firms that are registered formally
Managers experience	The experience of the managers in the firm

Female manager	The number of female managers within the firm
Total sales	Total sales of the firm both national and international
Sales main product	The sales of the main product that the firm(as percentage)
National sales	The total national sales of both manufacturing and service (as percentage)
Competition	The competition between the firm
Innovation new product or service	If the firm has introduced new product or service (binary)
Research and development	Creating new ideas on the firms development and growth
Wages and social payments	Payments made to the employees of the firm
Location	Where the firm is located (city)

4.2 Estimation method: linear regression model

In order to explain the employment in manufacturing and services firms in Rwanda, and understand the constraints and potential of the employment, a linear analysis has been used. And this helps to study the statistical relationship of the dependent variable in relation to more than one determined variable. Linear regression model structure captures the dependency of outcome on explained variable on independent variable as a simple function, particularly when there are several explanatory variables. It allows the identification of model parameters and provides parameters’ significance.

4.3. The Empirical Model’s Specifications, Estimation and Testing

In this section, we present the model used to empirically assess the factors determining manufacturing and service firms’ development in Rwanda considering employment and track the factors influencing the dependent variables are presented after which the model estimation is done, the outputs presented and tests for significance of coefficients are conducted and explained.

4.4 The empirical model and its specifications

Empirical model refers to a model where the structure is determined by the observed relationship among experimental data. The empirical model is to analysis of the employment and its development in manufacturing and service firms and its determinants in Rwanda.

The individual factors that influence the employment in manufacturing and service firms include; managers experience, female managers etc., while the factors influencing the firm includes; age (years of the firm), location of the firm, the wages the firm pays to the employees, the competitiveness of the firm, the total sales to mention but few. Starting with the factors that influence the employment in both manufacturing and service firms (model 1), we construct this regression model. This model will specifically on the manufacturing and service firms combined together.

$$(1) \text{ Employment in manufacturing and service firms} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \varepsilon_i$$

In this model, the dependent variable “employment in manufacturing and service” and the turning to the explanatory variables, the main factors include; X_1 stands for location of the firm, X_2 stands for establishment part of large firm, X_3 stands for size of the firm, X_4 stands for number of establishment that form firm, X_5 stands for age which is continuous, X_6 stands for formally registered firms, X_7 stands for managers experience, X_8 stands for female managers, X_9 stands for total sales of the firm, X_{10} stands for sales of main product, X_{11} stands for national sales, X_{12} stands for competition, X_{13} stands for innovation of new product or service, X_{14} stands for research development, X_{15} stands for wages and social payments and ε_i stands for error term.

The coefficients are presented with the symbol β with subscripts from 0 to 15 according to the independent variables. On the one hand is the null hypothesis, $H_0: \beta_i = 0$ that is $\beta_1, \beta_2, \dots, \beta_n = 0$. In this case where no independent variable has any effect on the employment on both manufacturing and service firms, and on the other way hand, there is alternative hypothesis, $H_1: \beta_i \neq 0$ which means that in the independent variables results a change in employment in both manufacturing and service firms. The positive coefficient is interpreted as having a positive effect and a negative

effect on employment. The main focus is on the properties of the factors that affects namely the signs of the effects and their consistency with our expectations, the size of effects and their statistical significance.

The second (model 2) was also used to assess the factors that determine the employment in manufacturing firms only.

$$(2) \text{ Employment in manufacturing firms} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \varepsilon_i$$

In this model, the dependent variable “employment in manufacturing firms” and the turning to the explanatory variables, the main factors include; X_1 stands for location of the firm, X_2 stands for establishment part of large firm, X_3 stands for size of the firm, X_4 stands for number of establishment that form firm, X_5 stands for age which is continuous, X_6 stands for formally registered firms, X_7 stands for managers experience, X_8 stands for female managers, X_9 stands for total sales of the firm, X_{10} stands for sales of main product, X_{11} stands for national sales, X_{12} stands for competition, X_{13} stands for innovation of new product or service, X_{14} stands for research development, X_{15} stands for wages and social payments and ε_i stands for error term.

For this model, the null hypothesis, $H_0: \beta = 0$, this implies that all the independent variables do not affect the employment in manufacturing firms. And the alternative hypothesis, $H_1: \beta \neq 0$, suggests that the independent variables have an effect on the employment in manufacturing firms.

The third (model 2) was also used to assess the factors that determine the employment in service firms only.

$$(3) \text{ Employment in service firms} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \varepsilon_i$$

In this model, the dependent variable “employment in service firms” and the turning to the explanatory variables, the main factors include; X_1 stands for location of the firm, X_2 stands for establishment part of large firm, X_3 stands for size of the firm, X_4 stands for number of establishment that form firm, X_5 stands for age which is continuous, X_6 stands for formally

registered firms, X_7 stands for managers experience, X_8 stands for female managers, X_9 stands for total sales of the firm, X_{10} stands for sales of main product, X_{11} stands for national sales, X_{12} stands for competition, X_{13} stands for innovation of new product or service, X_{14} stands for research development, X_{15} stands for wages and social payments and ε_i stands for error term. The null hypothesis, $H_0: \beta = 0$ implies that the independent variables have no effect on employment in service firms. The alternative hypothesis, $H_1: \beta \neq 0$ implies that independent variables have effect on employment in service firms.

CHAPTER FIVE: DATA PRESENTATION, ANALYSIS OF RESULTS AND INTERPRETATION

5.1 Empirical findings in employment research

The conceptualization of domestic factors as house hold and government consumption, gross fixed consumption, labor participation, growth rate and literacy, the external factors are conceived as external total debt, foreign direct investments and trade liberalization measured by imports and exports divided by Gross Domestic Product. The results shows that total debt, population, investments and GDP growth had a negative effect on manufacturing and service sector. In contract to trade liberalization, labor participation, aggregate consumption and government spending had a positive effect on manufacturing and service firms.

5.2. Estimation and testing

Linear regression is an approach for modeling the relationship between dependent variable (Y) and one or more explanatory variables (or independent variables) denoted as (X). The magnitude and direction relation are given by a parameter (β_1), and intercept term (β_0) captures the status of the dependent variable when the independent variable is absent. A final disturbance or error term (u) captures the amount of variation that is not predicted by the slope and intercept terms.

The results of the linear regression model for both manufacturing and service firms are presented in Table 3, where at 5 per cent level of confidence interval, the firm size, the number of establishment that form the firm, wages and social payments are statistically significant on employment. Therefore, we reject the null hypothesis of employment. The other coefficients are statistically insignificant, thus we do not reject the null hypothesis of employment. Location, age, age², formally registered, manager's experience, female manager, total sales, sales main product, competition, innovation new product or service, research and development, wages and social payments do not have any effect on employment.

The results of the linear regression model for manufacturing sector is presented in Table 2, where at 5 per cent, the level of confidence interval of firm size (1) and firm size(2), total sales, research

and development are statistically significant on employment and these leaves other variables statistically insignificant meaning that they don't have any effect on employment.

The results of the regression model for service sector is presented in Table 5, where at 5 per cent level of confidence interval, the firm size, the number of establishment that form the firm, wages and social payments are statistically significant on employment and these leaves other variables statistically insignificant meaning that they don't have any effect on employment.

The Tobit model also called a censored regression model, is designed to estimate linear relationships between variables when there is either left or right censoring in the dependent variable (also known as censoring from below and above, respectively). The table labeled coefficients give the coefficients, their standard errors and the z-statistic. Tobit regression coefficients are interpreted in the similar way to OLS regression coefficients (see Table 2).

A 1 per cent increase in the firm size 1 result in 2.2411 per cent increase in the employment for both manufacturing and service firms. Other things holding constant. A 1 per cent increase in the firm size 2 result in 0.9126 per cent increase in the employment for both manufacturing and service firms. Other things holding constant. A 1 per cent increase in the number of establishment that form the firm result in 0.1588 percent increase in the employment for both manufacturing and service firms. Other things holding constant. And A 1 per cent increase in the wages and social payments result in 0.2053 per cent increase in the employment for both manufacturing and service firms. Other things holding constant. All these factors are statistically significant at 0.05 per cent level of confidence interval.

Estimation results of linear regression of employment in both manufacturing and service firm's model indicate that the firm size of the firm can positively change the employment rate. A 1 per cent decrease in the firm size 1 result in 2.2431 and firm size 2 result in 0.9142 per cent decrease in the employment in manufacturing and services firms, other things holding constant. It is apparent that SMEs play an important role in all OCDE economies; they make up 95 per cent of enterprises and account for 60 to 70 per cent of jobs in most OCDE countries. The overall share of small firms in employment and output may be even higher given that establishments or firms in the service sector are normally of smaller average size than in manufacturing. The number of

establishment that form the firm determines the number of employees to be employed (See Table 3).

OCDE (1996) reported that the knowledge- based economy is marked by increasing labor market demand for more highly skilled workers who are also enjoying wage premiums. Studies in some countries show that the more rapid the introduction of knowledge-intensive means of production, such as those based on information technologies, the greater the demand for highly skilled workers. Other studies show that workers who use advanced technologies, or are employed in firms that have advanced technologies are paid higher wages. A 1 per cent increase in the number of establishment that form the firm result in 0.1591 per cent increase in employment, holding other factors constant.

A 1 per cent change in the wages and social payments result in 0.2032 per cent change in employment in both manufacturing and services firms. When wages and social payments are increased, the production of goods and services are also increased. Other things holding constant. As people age and gain work experience, their earnings might be expected to continue to rise or at least remain stable until retirement. However, this appears not to be the case with traditional age earnings profiles. The age earnings profile is commonly used to describe the growth of earnings over the life cycle (Thornton et al.1997). Since the p-value of age and age square are greater than 0.05 per cent, this means that they are statistically insignificant to employment on both manufacturing and service firms.

The economic integration and the location of the firms before setting out the details of intermediate goods production, the outline of framework in which the effects of demand and cost linkages on location of a single industry can be analyzed. Consider a monopolistically competitive industry in which each firm produces its own variety of differentiated product.

Insert Table 4 about here

The results presented in Table 4 of the linear regression of manufacturing sector model indicate that the coefficients of firm size 1, Firm size 2, total sales, research and development are statistically significant at the 90 per cent, 95 per cent and 99 per cent confidence interval since

their p-value is less than 0.05 per. The number of observations were 55 firms that were estimated in manufacturing sector.

By examining how employment is distributed across enterprises of different sizes in Indian manufacturing firms. As noted by the pioneering work of Mazumdar, 2003), the size distribution of Indian manufacturing enterprises is characterized by a missing middle whereby employment tends to be concentrated in small and large enterprises. A 1 per cent decrease in the firm size (1) result in a 2.3231 and firm size (2) result in a 0.7839 per cent decrease in employment of manufacturing sector and holding other factors constant.

A 1 per cent increase in total sales result in a 0.3596 increase in the employment. Holding other things constant. The changes in total sales of manufacturing sector in Rwanda is attributed to processed and finished goods that are ready to be consumed like beans, chips, juice, and others. Employment growth expressed by the costs incurred by a manufacturing firm for employment, employees; development as a trial of new approach or idea about products produced by the firms, business process, firm management or marketing.

A 1 per cent increase in research and development result in a 0.6345 increase in the employment of manufacturing sector. The process through which research and development promotes economic prosperity is complex and multi-faceted. The employees' development and research development activities are positively correlated with a change in the employment of the manufacturing service sector. Holding other factors constant. There are direct benefits to firms from their own research development investments (See Table 4).

The results presented in Table 5 of the linear regression of service sector model indicate that the coefficients of firm size 1, Firm size 2, number of establishment that form firm, wages and social payments are statistically significant at the 90 per cent, 95 per cent and 99 per cent confidence interval since their p-value is less than 0.05 per. The number of observations were 119 firms that were estimated in service sector.

A 1 per cent decrease in the firm size (1) result in a 2.3251 and firm size (2) result 0.8944 per cent decrease in the employment of services firms, other things holding constant. Human capital is suggested as being positively correlated with firm size by the theories in Rosen (1982) and Kremer

(1993). Rosen (1982) considers a hierarchical organizational structure, where improved labor productivity at any given level has effects that successively filter through all lower levels.

The service sector consists of the parts of the economy, i.e. activities where people offer their knowledge and time to improve productivity, performance, potential, and sustainability which is termed as affective labor. Service also known as intangible goods which include attention, advice, access, experience, and discussion. A 1 per cent increase in the number of establishment that form the firm result in 0.1657 per cent increase in the employment of the service sector. Holding other factors constant.

A 1 per cent increase in the wages and social payments results in 0.2391 per cent increase in the employment of the service sector. Study on wage setting systems and minimum rates of pay applicable to posted workers in accordance with directive 96/71/EC in a selected number of member states and sectors. Wages differ between countries due to differences in the costs of living, productivity, the working environment, and in the overall (im) balance between the supply of and the demand for labor. Sectoral minimum wages are typically the results of the overall collective bargaining processes and thus directly connected to the overall wage developments. Employers' pay policies can contribute to the gender wage gap if women are less likely to work at high paying firms or if women negotiate worse wage bargaining than men.

Adapting innovation new products or service, there are more dynamic business environment for services firms including greater openness to international competition, should do much to encourage greater uptakes of advanced technologies and foster innovative activities, additional efforts may also be needed. As shown in recent OECD (2005) work on benchmarking, innovation in knowledge based economies increasingly depends on the combination of entrepreneurship, ICT, innovation and human capital. Since innovation new product or new is statistically insignificant on both manufacturing and service with the decreasing change on employment. The innovation in variety of services sector innovation, as it is particularly important for services industries.

The increase of competition in local and global markets determined the importance of service innovation as a key source supports firms' growth and development. STI OECD stated "the importance of service innovation is well established but many firms are seeking new ways to

develop the type of service innovation necessary for success in global value chains”. Many service firms use delivery time guarantees to compete for customers in the marketplace. Demands are assumed to be sensitive to both the price and delivery time guarantees, and objective of each firm is to maximize its operational profit (See Table 5).

Insert Table 6 about here

The model in table 6 was estimated by ordinary least squares (OLS) with robust standard errors. The regression models was specified and estimated using STATA. These differed by generalization of the basic model of employment between manufacturing and service firms. They were used to study the impacts of various factors affecting employment in manufacturing and service firms in Rwanda at the firm level. The problem that heteroscedasticity presents for regression models is simple. Recall that ordinary least squares (OLS) regression seeks to minimize residuals and turn produce the smallest possible standard errors.

The serious problem associated with heteroscedasticity is the fact that the standard errors are biases. Because the standard error is central to conducting significance tests and calculating confidence intervals, biased standard errors lead to incorrect conclusions about the significance of the regression coefficients (See Table 6).

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1. Usefulness of Results and policy Recommendations

The goal of this study was to carry out an analysis of how manufacturing and services firms contribute to the development of employment in Rwanda and identifying the factors that has contributed to the growth and development of manufacturing and service firms using survey data that were collected from World Bank survey 2011 in Rwanda. Literature was reviewed to assess the similarities and dissimilarities in the findings all over the world. The descriptive analysis of the existing data and empirical analysis of micro data on the manufacturing and services firms were used to understand the functioning of employment in Rwanda. And the results were interesting and are useful for academics and both in the private and public sectors in Rwanda and other parts of the world.

The results of factors influencing employment in the manufacturing and service firms are very useful for the government because employment is a key to economic accelerator of growth and development. In public sector management, employment in both manufacturing and service firms have great positive impact on the government through payment of taxes by the employees. The government could use these findings to scale- up employment activities in manufacturing and service firms and shape the capacity building strategies and policy with these empirical facts.

This study is an asset for academicians and for future studies by the researchers and graduate students. The findings on employment can form the basis for expanding research in economic growth and development since it is In Rwanda's national policies in vision 2020, EDPRS II and others which will help Rwanda to be a middle income country. Thus, it is the responsibility of academia to support the government by providing facts to monitor the implementation of government policies for evidence based in interventions and decision making.

6.2 Policy Recommendations

The Government of Rwanda should emphasize on its employment policy by targeting new entrepreneurs operating in both manufacturing and services sector. With the regard to the role of employee development in promoting production and innovations in both manufacturing and services firms, it is much important for the government to put in place the mechanisms that would facilitate the entrepreneurs (both employees and managers of firms) in promoting innovations new product or service in both manufacturing and services firms. This could be incentives given to both manufacturing and services firms' managers who want their employees to be sent abroad for trainings or hiring international consultants to train locally on the basis of unique manufacturing and services related skills.

To make both manufacturing and services innovation policy complementing existing employment with emphasis on employees' development and enhanced training strategies to make it better. The innovation new product or service will help to implement the new policies that guides the production of goods and service in manufacturing and service sector.

As the Government of Rwanda decided to drive its economic growth through manufacturing and services firms and its aims to become a middle income country. This study gives recommendations that can help in speeding up the move from a low income economy to a middle income economy through the development and sustainable goals of the manufacturing and services firms in order for expansion. Rwanda's manufacturing sector has been experiencing a steady growth. But every success always has its own factors, which in case of Rwanda where manufacturing sector can be brought around one common denominator. In the increasing the number of establishment that form firm and formally registered will increase income of the country through taxation.

Develop and introduce new methods of research and development on how employment in manufacturing and service firms is done, It's good to have a positive relationship between the research and development and firm productivity across all sectors mainly manufacturing and service sector. This will increase the productivity of goods and services within the firm.

The national sales can be put in place for more emphasis on manufacturing and service firms that are ready to export the finished products outside the country by making more relationships with

other countries e.g. East African Community (EAC), COMESA etc. in order to have standardized national sales that will increase the revenues from outside the country and this will lead to the development of local industries for better production.

The government of Rwanda should continue to encourage both manufacturing and service firms that are unregistered to be registered formally for better follow up. Registered formally firms gets benefit from their businesses. Among those advantages, registered firms can benefit from legal and financial services provided by courts and commercial banks, services not available to unregistered firms.

Education and job training are certainly good policies to pursue on wages and social payments. They will raise at least some workers' productivity and helping to increase earnings for those workers in the manufacturing and service firms. Higher minimum wage laws would obviously provide higher wages for at least some workers. However such policies could also raise unemployment. According to the best research of economists, this unemployment increasing effect is not huge for moderate increase in the minimum wage. And if the minimum wage was increased to a living wage in the realm proposed by some activists the impact on unemployment would be much larger. So the better way is to minimize the wages to all activists in different sectors in order to reduce wage inequality.

Summary and Conclusions

This analysis of the employment in manufacturing and services firms in Rwanda has performed the useful details about the employment growth in Rwanda over the recent years and empirically estimates the determinants of employment using econometric methodology. The estimation is enabled by using micro-data used in this study are from the World Bank's enterprise survey 2011 on Rwanda. Employment reflects on the ability of a firm both manufacturing and service to generate values in Rwanda. Employment on both manufacturing and service can have strong implications for economic growth and welfare of the well-being of the human being.

The literature review on the manufacturing and service sector supports that both contribute more to economic growth. The key factors that contribute to the growth and development of manufacturing and services firms include rapid urbanization, increased demand for intermediate

and final consumer goods and services, domestic investment and openness, expansion of the public sector, financial attractiveness, application of information and technology, increase in consumption expenditure, expansion of markets through exportation, incentive system and investing more in research and development, education skills, adoption of culture. In Rwanda, the manufacturing sector is dominated by industries that process the finished products for consumption and for exports while the service sector is dominated by wholesale and retail trade, motorcycle and motor vehicle spare parts, accommodation and food services activities, human health and social work activities as sub-sectors.

After estimating the model on employment, manufacturing and service firms, results show that both manufacturing and service firms development in Rwanda is driven by various forces like the firm size, number of establishments that form a firm and wages and social payments.

Increased firm size has increased labor participation in both manufacturing and service firms, employee development and the trainings of personnel have largely boosted the manufacturing and service firms in Rwanda. As it has been explored through literature, manufacturing and service firms' development can contribute to employment which is advantageous to the population.

References

- Acharya, R., & Patel, R. (2015). Contribution of Telecom Sector to Growth of Indian Service Sector: An Empirical Study. *Indian Journal of Science and Technology*, 8(S4), 101-105.
- Alvarez-Cuadrado, F., & Poschke, M. (2011). Structural change out of agriculture: Labor push versus labor pull. *American Economic Journal: Macroeconomics*, 3(3), 127-158.
- Berentsen, W. H. (1996). Regional population changes in Eastern Germany after unification. *Post-Soviet Geography and Economics*, 37(10), 615-632.
- Besamusca, J., Tijdens, K. G., Ngeh Tingum, E., & Mbassana. E.M. (2012). Wages in Rwanda. Wage Indicator survey 2012. Amsterdam, Wage Indicator Foundation, Wage Indicator Data Report March 2013.
- Bryson, J. R. (2001). Services and internationalization: Annual report on the progress of research into service activities in Europe in 1998.
- Chenery, H.B. (1962). Comparative advantage and development policy. *American Economic Review*, 51(1), 18-51.
- Clark, T., & Rajaratnam, D. (1999). International services: perspectives at century's end. *Journal of services marketing*, 13(4/5), 298-310.
- Dawkins, P., Feeny, S., & Harris, M. N. (2007). Benchmarking firm performance. *Benchmarking: An International Journal*, 14(6), 693-710.
- Eichengreen, B., & Gupta, P. (2011). *The service sector as India's road to economic growth* (No. w16757). National Bureau of Economic Research.
- Ericson, R., & Pakes, A. (1995). Markov-perfect industry dynamics: A framework for empirical work. *The Review of Economic Studies*, 62(1), 53-82.
- Erzan, R., Kuwahara, H., Marchese, S., & Vossenaar, R. (1988). The profile of protection in developing countries. *Discussion Papers (UNCTAD)*.

- Evenson, R. E., & Westphal, L. E. (1995). Technological change and technology strategy. *Handbook of Development Economics*, 3, 2209-2299.
- Fisk, R. P., Brown, S. W., & Bitner, M. J. (1993). Tracking the evolution of the services marketing literature. *Journal of Retailing*, 69(1), 61-103.
- Grönroos, C. (1999). Internationalization strategies for services. *Journal of services marketing*, 13(4/5), 290-297.
- Hopenhayn, H. A. (1992). Entry, exit, and firm dynamics in long run equilibrium. *Econometrica: Journal of the Econometric Society*, 1127-1150.
- Jarvis, L. S. (1974). The Limited Value of Employment Policies for Income Inequality. *Ref. [3]*.
- Johns, N. (1999). What is this thing called service?. *European Journal of Marketing*, 33(9/10), 958-974.
- Jones, R. S., & Yoon, T. (2008). Enhancing the productivity of the service sector in Japan. *OECD Economic Department Working Papers*, (651), 0_1.
- Jovanovic, B. (1982). Selection and the Evolution of Industry. *Econometrica: Journal of the Econometric Society*, 649-670.
- Kasper, W. (1978). Australia's economic and industrial structures: past patterns and prospective trends. *Growth, Trade and Structural Change in an Open Australian Economy*, 90-124.
- Keller, W. (1996). Absorptive capacity: On the creation and acquisition of technology in development. *Journal of Development Economics*, 49(1), 199-227.
- King, R. G., & Levine, R. (1993). Financial intermediation and economic development. *Capital markets and financial intermediation*, 156-189.
- Knight, G. (1999). International services marketing: review of research, 1980-1998. *Journal of Services Marketing*, 13(4/5), 347-360.

- Kremer, M. (1993). The O-ring theory of economic development. *The Quarterly Journal of Economics*, 108(3), 551-575.
- Laterite (2015). Youth employment in Rwanda. A scoping Paper.
- Lockyer, K. (1986). Service—a Polemic and a Proposal. *International Journal of Operations & Production Management*, 6(3), 5-9.
- Lovelock, C. H. (1983). Classifying services to gain strategic marketing insights. *The Journal of Marketing*, 9-20.
- Lovelock, C. H. CH (1999). Developing Marketing Strategies for Transnational Service Operations. *The Journal of Services Marketing*, 13(4/5), 278-289.
- Lovelock, C., & Gummesson, E. (2004). Whither services marketing? In search of a new paradigm and fresh perspectives. *Journal of Service Research*, 7(1), 20-41.
- Maroto Sánchez, A., & Cuadrado Roura, J. R. (2011). Analyzing the role of service sector on productivity growth across European regions.
- Mazumdar, D. (2003). Trends in employment and the employment elasticity in manufacturing, 1971–92: an international comparison. *Cambridge Journal of Economics*, 27(4), 563-582.
- Mohr, L. A., & Bitner, M. J. (1995). The role of employee effort in satisfaction with service transactions. *Journal of Business Research*, 32(3), 239-252.
- Munnell, A. H. (1992). Policy watch: infrastructure investment and economic growth. *The Journal of Economic Perspectives*, 6(4), 189-198.
- Nachum, L., & Keeble, D. (1999). *Neo-Marshallian nodes, global networks and firm competitiveness: the media cluster of central London*. ESRC Centre for Business Research, Department of Applied Economics, University of Cambridge.
- Nelson, R. R. and E.S. Phelps (1966). Investment in humans, technological diffusion, and economic growth. *The American economic review*, 56(1/2), 69-75.

- Ng, F. (1996). A Profile of Tariffs, Para-Tariffs, Non-Tariff Measures, and Economic Growth in Developing Countries. *World Bank, International Trade Division, Int. Econ. Dept.*
- NISR, (2014). Establishment census report, Kigali Rwanda
- NISR, (2016). Statistical yearbook 2016, Kigali, Rwanda
- OCDE, O. (1996). The Knowledge-based economy. *Organisation for economic cooperation and development, OEcD, OECD, 2*, 1-46.
- Olofin, O. P., Olufolahan, T. J., & Jooda, T. D. (2015). Food Security, Income Growth and Government effectiveness in WEST African Countries. *European Scientific Journal, 11*(31).
- Park, D., & Shin, K. (2012). The service sector in Asia: Is it an engine of growth?
- Pereira, A. M., & Roca-Sagalés, O. (2003). Spillover effects of public capital formation: evidence from the Spanish regions. *Journal of Urban Economics, 53*(2), 238-256.
- Reuber, A. R., & Fischer, E. (2002). Foreign sales and small firm growth: The moderating role of the management team. *Entrepreneurship Theory and Practice, 27*(1), 29-45.
- Rosen, S. (1982). Authority, control, and the distribution of earnings. *The Bell Journal of Economics, 3*11-323.
- Samiee, S. (1999). The internationalization of services: trends, obstacles and issues”, *Journal of Services Marketing, 13*(4/5) 319-328.
- Sampson, S. E., & Froehle, C. M. (2006). Foundations and implications of a proposed unified services theory. *Production and Operations Management, 15*(2), 329-343.
- Sasser, E.W., Olsen P. R. & Wyckoff. D. D. (1978). *Management of service operations: Text, cases, and Readings*. Boston, MA: Allyn and Bacon.
- Schiff, M., & Valdés, A. (1992). *The political economy of agricultural pricing policy. Vol. 4: a synthesis of the economics in developing countries*.

- Shingal, A. (2014). The Services Sector in India's States: A Tale of Growth, Convergence and Trade. *The World Economy*, 37(12), 1773-1793.
- Shostack, G. L. (1984). Designing service that deliver. *Harvard Business Review*, 62(1), 133-139.
- Singh, M., & Kaur, K. (2014). India's services sector and its determinants: An empirical investigation. *Journal of Economics and Development Studies*, 2(2), 385-406.
- Slack, N., Lewis, M., & Bates, H. (2004). The two worlds of operations management research and practice: can they meet, should they meet?. *International Journal of Operations & Production Management*, 24(4), 372-387.
- Smith, N., Smith, V., & Verner, M. (2006). Do women in top management affect firm performance? A panel study of 2,500 Danish firms. *International Journal of Productivity and Performance Management*, 55(7), 569-593.
- Tax, S. S., & Stuart, I. (1997). Designing and implementing new services: The challenges of integrating service systems. *Journal of Retailing*, 73(1), 105-134.
- Thornton, R. J., Rodgers, J. D., & Brookshire, M. L. (1997). On the interpretation of age-earnings profiles. *Journal of Labor Research*, 18(2), 351-365.
- Tybout, J. R. (1998). *Manufacturing Firms in Developing Countries: How Well do they do, and why?* (Vol. 1965). World Bank Publications.
- UNECA, (2015) Assessing progress in Africa toward the Millennium development goals.
- Vargo, S. L., & Lusch, R. F. (2004). The four service marketing myths: remnants of a goods-based, manufacturing model. *Journal of Service Research*, 6(4), 324-335.
- Wu, Y. (2007). Service sector growth in China and India: A comparison. *China: An International Journal*, 5(01), 137-154.
- Zeithaml, V.A., Parasuraman. A., & Berry L.L. (1985). Problems and strategies in services marketing. *Journal of Marketing*, 49(2), 33-36.
- Zhou, M. (2015). *Labor's Share of Income: Another Key to Understand China's Income Inequality*. Springer.

Table 2: Tobit model Generalized (Manufacturing and service firms)

Variables	Coef.	Std. Err.	t	P>t	[95% Co	Interval]
Employment(ln)						
Location	0.6635	0.3708	1.79	0.076	-0.0690	1.3960
Establishment part of large firm	-0.2881	0.1954	-1.47	0.142	-0.6740	0.0977
Firm size 1	2.2411	0.1876	11.94	0.000	1.8704	2.6118
Firm size 2	0.9126	0.1152	7.92	0.000	0.6849	1.1402
Number of establishment that form firm	0.1588	0.0461	3.44	0.001	0.0676	0.2499
Age	-0.0046	0.0157	-0.29	0.770	-0.0357	0.0265
Age2	0.0001	0.0003	0.45	0.655	-0.0005	0.0009
Formally registered	-0.0765	0.1672	-0.46	0.648	-0.4068	0.2537
Managers experience	0.0029	0.0056	0.53	0.600	-0.0082	0.0141
Female manager	0.0022	0.1279	0.02	0.986	-0.2505	0.2550
Total sales(ln)	0.0711	0.0460	1.55	0.124	-0.0197	0.1622
Sales main product(ln)	-0.0747	0.0949	-0.79	0.433	-0.2623	0.1128
National sales(ln)	0.0088	0.1877	0.05	0.962	-0.3619	0.3796
Competition	-0.0839	0.0920	-0.91	0.363	-0.2657	0.0979
Innovation new product or service	-0.0578	0.0996	-0.58	0.562	-0.2546	0.1389
Research and Development	0.0244	0.1039	0.23	0.815	-0.1809	0.2297
Wages and social payments	0.2053	0.0578	3.55	0.001	0.0910	0.3195
Cons	-2.8433	1.1788	-2.41	0.017	-5.1717	-0.5147
Number of Obs	174					

Table 3: Linear regression (model 1) Manufacturing and Service and its determinants

Variables	Coef.	Std. Err.	t	P>t	[95%	Interval]
Employment(ln)						
Location	0.5795	0.3813	1.52	0.131	-0.1735	1.3326
Establishment part of large firm	-0.2882	0.2053	-1.40	0.162	-0.6937	0.1173
Firm size 1	2.2431***	0.1972	11.37	0.000	1.8535	2.6326
Firm size 2	0.9142***	0.1211	7.55	0.000	0.6750	1.1533
A Number of establishment that form	0.1591***	0.0485	3.28	0.001	0.0633	0.2549
Age	-0.0044	0.0165	-0.26	0.792	-0.0370	0.0283
Age2	0.0001	0.0004	0.41	0.680	-0.0006	0.0009
Formally registered	-0.0708	0.1756	-0.40	0.687	-0.4177	0.2761
Managers experience	0.0028	0.0059	0.49	0.628	-0.0088	0.0146
Female manager	0.0051	0.1344	0.04	0.970	-0.2604	0.2706
Total sales(ln)	0.0712	0.0484	1.47	0.143	-0.0243	0.1667
Sales main product(ln)	-0.0734	0.0997	-0.74	0.463	-0.2705	0.1236
National sales(ln)	0.0094	0.1973	0.05	0.962	-0.3803	0.3991
Competition	-0.0854	0.0967	-0.88	0.379	-0.2764	0.1056
Innovation new product or service	-0.0614	0.1046	-0.59	0.558	-0.2681	0.1453
Research and Development	0.0245	0.1092	0.22	0.823	-0.1913	0.2403
Wages and social payments(ln)	0.2032***	0.0607	3.34	0.001	0.0832	0.3232
Cons	-2.7364	1.2345	-2.22	0.028	-5.1749	-0.2979
Number of Obs	174					

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ significant levels

Table 4: Linear regression (model 2) Manufacturing sector and its determinants

Variables	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Employment(ln)						
Location	1.2535	0.7841	1.60	0.118	-0.3351	2.8422
Establishment part of large firm	-0.2283	0.5881	-0.39	0.700	-1.4200	0.9633
Firm size 1	2.3231***	0.4529	5.13	0.000	1.4054	3.2408
Firm size 2	0.7839***	0.2956	2.65	0.012	0.1847	1.3831
Number of establishment that for	0.5402	0.6499	0.83	0.411	-0.7766	1.8571
Age	-0.0109	0.0331	-0.33	0.743	-0.0781	0.0562
Age2	0.0001	0.0006	0.12	0.908	-0.0013	0.0015
Formally registered	-0.3801	0.4006	-0.95	0.349	-1.1918	0.4316
Managers experience	-0.0135	0.0141	-0.97	0.340	-0.0421	0.0148
Female manager	0.1726	0.2784	0.62	0.539	-0.3915	0.7366
Total sales(ln)	0.3596***	0.1244	2.89	0.006	0.1076	0.6117
Sales main product(ln)	0.0625	0.2276	0.27	0.785	-0.3986	0.5237
National sales(ln)	0.0485	0.2295	0.21	0.834	-0.4166	0.5136
Competition	0.1191	0.2161	0.55	0.585	-0.3187	0.5570
Innovation new product or service	-0.0930	0.2046	-0.45	0.652	-0.5076	0.3216
Research and Development	0.6345***	0.2945	2.15	0.038	0.0376	1.2314
Wages and social payments(ln)	-0.0802	0.1603	-0.50	0.620	-0.4051	0.2445
Cons	-4.7313	2.2087	-2.14	0.039	-9.2067	-0.2559
Number of Obs	55					

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ significant levels

Table 5: Linear regression (model 3) Services sector and its determinants

Variables	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Employment(ln)						
Location	0.6348	0.4856	1.31	0.194	-0.3286	1.5983
Establishment part of large firm	-0.2839	0.2728	-1.04	0.300	-0.8251	0.2572
Firm size 1	2.3251***	0.2424	9.59	0.000	1.8442	2.8061
Firm size 2	0.8944***	0.1442	6.20	0.000	0.6084	1.1804
Number of establishment that form firm	0.1657***	0.0492	3.37	0.001	0.0681	0.2634
Age	-0.0161	0.0223	-0.72	0.471	-0.0603	0.0281
Age2	0.0002	0.0006	0.41	0.680	-0.0009	0.0014
Formally registered	0.0271	0.2131	0.13	0.899	-0.3956	0.4497
Managers experience	0.0048	0.0068	0.71	0.480	-0.0087	0.0185
Female manager	0.0185	0.1624	0.11	0.909	-0.3036	0.3406
Total sales(ln)	0.0015	0.0553	0.03	0.979	-0.1083	0.1113
Sales main product(ln)	-0.0524	0.1194	-0.44	0.662	-0.2894	0.1845
National sales(ln)	-0.2987	0.5231	-0.57	0.569	-1.3351	0.7383
Competition	-0.1068	0.1193	-0.90	0.373	-0.3434	0.1298
Innovation new product or service	0.0300	0.1259	0.24	0.812	-0.2198	0.2798
Research and Development	-0.1495	0.1303	-1.15	0.254	-0.4081	0.1089
Wages and social payments(ln)	0.2391***	0.0694	3.44	0.001	0.1014	0.3767
Cons	-0.8262	2.6658	-0.31	0.757	-6.1144	4.4621
Number of Obs	119					

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ significant levels

Table 6: Linear regression (model 3) Manufacturing and Services sector

White Heteroscedasticity test

Variables	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
Employment(ln)					
Location	0.5795	0.4849	1.19	0.234	-0.3784 1.5375
Establishment part of large firm	-				
0.2882		0.2043	-1.41	0.160	-0.6917 0.1153
Firm size 1	2.2431	0.2552	8.79	0.000	1.7389 2.7473
Firm size 2	0.9142	0.1217	7.51	0.000	0.6736 1.1547
Number of establishment that form firm	0.1592	0.0736	2.16	0.032	0.0137 0.3044
Age	-0.0043	0.0182	-0.24	0.810	-0.0402 0.0314
Age2	0.0001	0.0004	0.38	0.704	-0.0007 0.0010
Formally registered	-0.0708	0.1831	-0.39	0.699	-0.4325 0.2908
Managers experience	0.0028	0.0053	0.54	0.591	-0.0076 0.0134
Female manager	0.0051	0.1161	0.04	0.965	-0.2242 0.2345
Total sales(ln)	0.0712	0.0402	1.77	0.078	-0.0081 0.1505
Sales main product(ln)	-0.0734	0.0831	-0.88	0.379	-0.2376 0.0908
National sales(ln)	0.0094	0.0974	0.10	0.923	-0.1830 0.2018
Competition	-0.0854	0.0968	-0.88	0.379	-0.2767 0.1059
Innovation new product or service	-0.0614	0.0988	-0.62	0.536	-0.2567 0.1339
Research and Development	0.0245	0.1181	0.21	0.836	-0.2088 0.2578
Wages and social payments(ln)	0.2032	0.0581	3.50	0.001	0.0883 0.3180
Cons	-2.7364	1.1200	-2.44	0.016	-4.9487 -0.5241
Number of Obs	174				

Table 7: Appendix1. Correlation matrix of manufacturing and service firms, N=174

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Employment	1															
Location	-0.002	1														
Establishment	0.128	0.034	1													
Firm size	-0.587	0.006	-0.139	1												
Number of establishment that form firm	0.295	0.024	0.204	-0.188	1											
Age	0.236	-0.086	0.104	-0.272	-0.003	1										
Formally registered	-0.077	0.105	0.005	-0.077	0.004	-0.007	1									
Managers experience	0.131	-0.161	-0.02	-0.162	-0.062	0.265	-0.059	1								
Female manager	-0.075	-0.173	0.006	0.087	-0.069	0.192	0.047	-0.088	1							
Total sales	0.196	-0.015	-0.025	-0.28	0.068	0.082	0.072	0.053	-0.034	1						
Sales main product	0.065	0.094	0.000	-0.067	0.081	-0.060	0.268	-0.103	-0.060	0.117	1					
National sales	-0.010	-0.015	0.048	0.025	0.034	-0.065	-0.026	0.016	0.052	0.005	-0.106	1				
Competition	-0.042	0.050	0.011	-0.008	0.019	0.055	-0.081	0.070	0.009	-0.048	-0.075	-0.018	1			
Innovation new product or sales	0.146	-0.007	0.04	-0.136	0.127	0.118	-0.086	0.131	0.027	0.017	-0.074	0.086	0.094	1		
Research and Development	0.180	0	-0.084	-0.13	0	0.117	0.027	0.096	-0.064	-0.028	-0.024	0.067	0.065	0.202	1	
Wages and social payments	0.574	-0.032	0.024	-0.523	0.054	0.252	0.005	0.160	0.000	0.477	0.082	-0.019	-0.05	0.016	0.18	1

Table 8: Appendix 2. Descriptive statistics of determinants of employment

Variable	Obs	Mean	Std. Dev.	Min	Max
Employment	174	57.83264	133.5541	1	1009
Location	174	0.958506	0.1998	0	1
Establishment part of large firm	174	0.049793	0.2179	0	1
Firm size	174	2.381743	0.6918	1	3
Number of establishment that form firm	174	1.141079	0.8832	1	12
Age	174	11.11203	9.9595	1	52
Formally registered	174	0.875519	0.3308	0	1
Managers experience	174	13.06639	9.0361	0	42
Female managers	174	0.19917	0.4002	0	1
Total sales	174	1.64E+09	6.73E+09	1300000	8.10E+10
Sales main product	174	68.86087	25.3762	7	100
National sales	174	98.37238	8.6563	5	100
Competition	174	0.493776	0.5010	0	1
Innovation and product or service	174	0.614108	0.4878	0	1
Research and Development	174	0.307054	0.4622	0	1
Wages and social payments	174	1.49E+08	8.63E+08	96000	1.20E+10

Table 9: Appendix 3. NESTED model of Manufacturing and service sector

Variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Employment(ln)						
Location	0.5795	0.3813	1.52	0.131	-0.1734	1.3326
Establishment part of large firms	-0.2882	0.2053	-1.40	0.162	-0.6937	0.1173
Firm size 1	2.2431	0.1972	11.37	0.000	1.8536	2.6326
Firm size 2	0.9142	0.1211	7.55	0.000	0.6750	1.1533
Number of establishment that form firm	0.1591	0.0484	3.28	0.001	0.0633	0.2549
Age	-0.0043	0.0165	-0.26	0.792	-0.0370	0.0283
Age2	0.0001	0.0004	0.41	0.680	-0.0006	0.0009
Formally registered	-0.0708	0.1756	-0.40	0.687	-0.4177	0.2761
Managers experience	0.0028	0.0059	0.49	0.628	-0.0088	0.0146
Female manager	0.0051	0.1344	0.04	0.970	-0.2604	0.2706
Total sales(ln)	0.0712	0.0484	1.47	0.143	-0.0243	0.1667
Sales main product(ln)	-0.0734	0.0997	-0.74	0.463	-0.2705	0.1236
National sales(ln)	0.0094	0.1973	0.05	0.962	-0.3803	0.3991
Competition	-0.0854	0.0967	-0.88	0.379	-0.2764	0.1056
Innovation new product or service	-0.0614	0.1046	-0.59	0.558	-0.2681	0.1453
Research and Development	0.0245	0.1093	0.22	0.823	-0.1913	0.2403
Wages and social payment(ln)	0.2032	0.0607	3.34	0.001	0.0832	0.3232
Cons	-2.7364	1.2345	-2.22	0.028	-5.1749	-0.2979

Number of obs

174

Log likelihood = -156.06396