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Product and Process Innovations in the Palestinian Plastic Industry

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Product and Process Innovations in the Palestinian Plastic Industry

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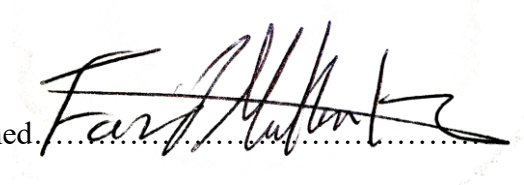
Dedication

This work is dedicated to my inspiring parents for being the pillows, role models, catapults, cheerleading squad, and sounding boards I have needed.

Declaration

I Certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed. 

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Abstract

As a result of the rapid technological development in this knowledge-based era, it has become necessary to develop and thrive the Palestinian economy through developing the industrial sector. This study aimed to find out how to develop the Palestinian industry through adopting innovations by focusing on the plastic industry in the West Bank. To achieve that goal, this study investigated the specifications of plastic industry and the required factors that could induce innovation and the role of different functional areas in the Palestinian industry

This study inspected the main characteristics of the Palestinian plastic industry through its activities. Hence, in relation to these characteristics and activities, it was essential to investigate the role of innovation to develop this industry. Hence, to provide a comprehensive picture of how firms innovate, the theoretical framework explained innovation through discussing its main drivers and outcomes on several economic, business and managerial factors. Throughout the theoretical framework, a detailed explanation of the most important and relevant variables was discussed in detail such as creativity, knowledge, linkages, the firm's environment, and culture. This theoretical framework was designed depending upon numerous empirical studies. In the theoretical framework, the impacts/outcomes of innovation were explained and how innovation could achieve a competitive advantage. Moreover, it provided a well understanding about the theoretical model in this study, which showed how these variables relate to each other in order to be able to compare the findings of this study with previous ones.

For this research, the methodologies of questionnaire and interview were used. A questionnaire was used to collect primary data from plastic firms in the West Bank. The qualitative approach was followed to explore the characteristics and attributes of plastic firms toward product innovation and process innovation. The questionnaire focused on product and process innovation plus the changes in the products number, market share, sales, profits, exports, and the number of external markets in order to determine the actual change during the past three years (2012 – 2014).

The questionnaire was distributed among a sample of Palestinian plastic firms in the West Bank (N=53), which tried to include all the population due to its small and undetermined size; firms' name and location were provided through connecting with Chambers of Commerce in the West Bank.

It is concluded that Palestinian Plastic firms in the West Bank are not familiar with innovations and its importance to achieve growth and competitive advantage. Moreover, those firms showed that the highest interest for plastic firms is to reduce their production costs in order to compete in domestic and external markets. Thus, it was found that plastic firms in the West Bank have more intention to perform process innovations rather than product innovations. Also, plastic firms still work on the traditional methods because of to the limited investment in modern machinery & equipment. It is therefore recommended that chambers of commerce and industrial unions should explain to the firms the importance of innovation and its effective role in the growth of this industry. Moreover, plastic firms should expand their knowledge to enhance their staff with vital and useful information and skills. In addition to that, plastic firms should alter their existing system, work environment, and strengthen their linkages with universities and scientific institutions through creating a mutual training and joint programs in training besides research and development.

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Abbreviations

- G.S: Gaza Strip.
- MI: Marketing Innovation
- Non-R&D: Non-Research & Development
- OI: Organizational innovation
- PalTrade: Palestine Trade Center
- PCBS: Palestinian Central Bureau of Statistics.
- PFI: Palestinian Federation of Industries.
- PMA: Palestine Monetary Authority.
- Pr: Product Innovation.
- Ps: Process Innovation.
- R&D: Research & Development
- SME: Small and Medium-sized Enterprises
- UNECE: The United Nations Economic Commission for Europe
- W.B: the West Bank.

“Innovation is the specific instrument of entrepreneurship. The act that endows resources with a new capacity to create wealth.” Peter Drucker

Chapter1

Background of the Study

This chapter summarizes the major indicators of the Palestinian industry with a focus on the plastic industry in the West Bank. It provides an overview of the Palestinian industry through discussing its main indicators and problems in order to provide a solution about how to develop and prosper this industry through employing innovation.

1.1 The status of the Palestinian Economy

Since the Israeli occupation of the West Bank in 1967, the Palestinian economy had become linked with the Israeli economy, and this led to continuous and persistent fluctuations in the Palestinian economy. Moreover, the Palestinian economy is characterized by a small and open economy that is liable to various distortions and deteriorations. This issue made Palestine an economy that bears the burden of the clash on the worldwide level and faces particular changes, which is one of the most difficult state building processes in the world. Therefore, Palestine has to develop its economy despite the various restrictions imposed by the Israeli occupation (Khatib et al., 2013; Dombrecht, Sarsour & Abu-Zaitun, 2012; Wallner & Prauhart, 2012).

According to the Palestine Monetary Authority (2014), the Palestinian economy is a service oriented one that is dominated and controlled by services activities, which account for a large portion of the Palestinian gross domestic product (DGP). In addition, the performance of the services sector in general affects and characterizes the overall economic efficiency. In 2013, the service sector's contribution to real GDP was about 54.2%, while the productive sectors

contribution accounted for 32.2% to real GDP (15.4% for construction, 12.5% for manufacturing, and 4.3% for agriculture) and indirect taxes 13.6% of GDP (Palestine Monetary Authority, 2014).

The Palestinian industrial sector had witnessed a growth of 3% in the year 2013. Despite the differences in statistical sources about the Palestinian economy, it is characterized by low competitiveness in relation to other economies (Central Intelligence Agency, 2014; Dombrecht, Sarsour & Abu-Zaitun, 2012).

1.2 The status of the Palestinian industries

The industrial sector in any country is considered the driver to other sectors. Referring to the Palestinian Centre Bureau of Statistics (PCBS), the industrial sector constituted only about 13% of the total enterprises in the private and nongovernmental organizations. It absorbs about 20.6% of the total Palestinian labor force[1], contributes about 38% to the total output[2] and 25% to the value added[3] from the operational economic enterprises in Palestine. In relation to the Palestine Monetary Authority (2014), in 2013, mining, quarrying, and manufacturing sectors employed about 12.3% of the total Palestinian workforce. Moreover, the industrial sector was ranked in the third position after the services and tourism sectors, respectively. In 2014, that percentage increased to 12.4% and then to 12.7% in the first and second quarters, respectively (Palestinian Federation of Industries, 2009; Palestine Monetary Authority, 2014; PCBS, 2014).

The Palestinian industrial sector acquired about 3.5% of the total number of stocks traded, which valued at 276.4 million dollars, with a percentage of 8.5% of the total market value

[1] **Labor force**: individuals aged from 15 years and over, who either are employed or are seeking employment.

[2] **Output**: It is the goods and services produced by an establishment, excluding the value of any goods and services used in an activity for which the establishment does not assume the risk of using the products in production, and excluding the value of goods and services consumed by the same establishment except for goods and services used for capital formation (fixed capital or changes in inventories) or own final consumption.

[3] **Value added**: it is the generated value of any unit that carries out any productive activity. Gross value added is the value of gross output less the value of intermediate consumption.

of the companies listed on the Palestine Exchange Market (Palestine Monetary Authority, 2014).

1.2.1 The Size of Palestinian Firms

UNECE (2004) argued that the Palestinian economy still dominated by micro-enterprises, which employ fewer than five persons. These enterprises constituted about 92% of the total enterprises in 1999 while the percentage of the small enterprises (employ between 5-19 persons) and medium-sized enterprise (20-50 persons) were about 9% and 1%, respectively. In addition, the manufacturing sector in Palestine does not have the largest share in total real value added in the economy. Generally, in most countries the Business Cycle Index (BCI) [4] in the manufacturing sector exhibits the highest correlation with overall GDP (UNECE, 2004; Khalil, Aref & Bsharat, 2013).

In Palestine, there is a high GDP vitality with a consistent unemployment trend. Hence, the Palestinian economy has to decrease the unemployment rate by generating new employment and job opportunities to meet the Palestinian fast-growing population. Moreover, because the Palestinian economy cannot offer job opportunities for qualified people, this resulted in a brain drain. The priority sectors have witnessed a growth of qualified personnel traveling to Jordan, the United States, and other countries (PalTrade, 2014).

During 2013, the manufacturing and construction sectors were the main growth drivers of the economic growth. The manufacturing sector in Palestine (including West Bank & Gaza Strip) contains the largest number of enterprises. In the year 2004, it included 12,033 manufacturing enterprises out of 12,960 enterprises that work in various industrial activities; 94.8% of these enterprises are small enterprises (employ less than five employees). According to UNECE ' report for the year 2004, enterprises that employed between 50 & 99 persons were only 124 and those who employed more than 100 persons did not exceed 62 enterprises. Thus, Palestinian industry is mainly dominated by small enterprises (Palestine Monetary Authority, 2014; PCBS, 2006; UNECE, 2004).

[4] **The Business Cycle Index (BCI)** forecasts the strength of economic expansion or recession in the coming months, along with forecasts for other prominent economic measures (Business Cycle Index, 2015)

1.2.2 The Contribution of the Palestinian Industrial Sector

The Palestinian industrial sector had increased its contribution to GDP from 8% in the mid-eighties to 17% in the late nineties. After that, this proportion had decreased significantly during the first years of the second intifada and then approached about 16% in recent years. The industrial sector in Palestine plays an important role in the economic development. It is considered as one of the most important sectors of the economy because it forms a base of the economic pyramid, from which it stems many areas and links to other sectors (Palestinian Federation of Industries, 2009).

In 2013, the industrial activity in Palestine had witnessed an increase of 7.2% compared to the year 2012. In years 2012 and 2013, there was a clear contradiction in the sectoral contribution to growth rates, particularly for industrial activities, construction, and services (Palestine Monetary Authority, 2014).

1.2.3 Palestinian Exports & Trading

The Palestinian Trade Center reported that most of the Palestinian exports are concentrated in natural resource-based manufacturing, low technology, and sophisticated manufacturing commodities. Moreover, Palestinian exports had decreased in high technology and sophisticated sectors. Concerning the destination of Palestinian exports, between years 2008 – 2010, Israel & Jordan formed the major destinations for Palestinian exports, which accounted for 93% of all Palestinian exports. In the period 2002-2004, those two destinations accounted for 95% of all exports. Whereas, other exports to countries like the United States of America, the United Arab Emirates (UAE) and Saudi Arabia formed about 1.4% and 2.8% of the total Palestinian exports, respectively (PalTrade, 2014).

During 2007 – 2011, Palestinian exports of goods and services accounted only about 15.8% of GDP, while the share of imports in this period was almost 65.1%. This indicates that the Palestinian economy suffers from the lack of low exports and huge imports due to the low degree of competitiveness in the domestic and foreign markets (Dombrecht, Sarsour & Abu-Zaitun, 2012).

In relation to the main Palestinian exports, during 2008 and 2010, around 25% of the exports were building stones and marbles. Moreover, in the same period, 21.4 % of the total exports

included remelting iron, plastics, pharmaceuticals, furniture, and footwear (PALTRADE, 2014).

However, Palestine depends largely on imports with a limited ability to develop the exports, which forms a deficit in the trade balance. That could be attributed to the weak competitiveness of products in foreign markets due to the high cost of production. This increase in production costs and low levels of quality has resulted from the difficulty in providing inputs to produce commodities for export, which made it difficult for Palestinian firms to develop and diversify their exports. Therefore, this deficit in the balance of trade is the outcome of the high average prices of imported goods and services relative to the prices of exported goods and services. As a result, this decline in the terms of trade implies a loss of income (Dombrecht & Sarsour, 2011; Palestine Monetary Authority, 2014; PalTrade, 2014).

According to the structure of the Palestinian industry, the enterprises are characterized by underdeveloped structures and most of them involve in light industries that produce basic goods for consumers; this underdeveloped industrial base made a limited contribution to the private sector in Palestine (UNECE , 2004).

1.2.4 The Palestinian Industrial Private Sector

The industrial sector is a long-term investment, but it is liable to external environmental factors and open to countries characterized by low-cost production capacity. In the last decade, the performance of the Palestinian industries was greatly improved, but they still suffering from many obstacles such as political instability and restrictions (Palestinian Federation of Industries, 2004; Palestinian Federation of Industries, 2009).

Sabri (1999) previously confirmed about the general features about the Palestinian industry; most studies have found that the measures and restrictions imposed by the Israeli occupation are the major obstacles that hindered the development of the industrial sector.

According to the UNECE (2004), the political instability and the Palestinian economy's relations with Israel have limited the development of Palestinian SMEs. Moreover, most of the Palestinian firms have managerial conflicts and established by entrepreneurs who lack prior technical or marketing experience, rely on rebuilt or old machines, import their raw materials, as well as participate in limited marketing activities.

Around 26% of the manufacturing firms were founded by entrepreneurs with no previous technical experience in Palestine where 27% of the investors had experience in their field, and employee entrepreneurship based ventures form only about 9% (Sabri, 1999).

In addition, the investment environment in the West Bank suffers from pushing factors that forced businessmen to invest in risk and uncertainty, which are the major factors behind the modest investment in manufacturing (Smeirat, 2011).

1.3 Overview of the Palestinian Plastic Industry and Its Main Indicators

Palestinian plastic industry is viewed as one of the small industries, which needs to be inspired in order to increase its market share and overall growth. It is one of the industries with few firms that have adopted extraordinary innovative strategies, and methodologies to awaken up this industry into a competitive position.

In the West Bank, the productivity of plastic firms is concentrated in five traditional types of production: extrusion, injection, Rotational molding, blow molding, and thermal- molding (Royal, Personal Communication, November 30, 2014).

In the following sections, the main indicators of the plastic industry are discussed briefly.

1.3.1 Number of Working Firms, Firms Distribution, Employment, Size and Production in the West Bank

According to the PCBS (2014), the Plastic industry is listed under "Plastic & Rubber Industry", and there are only 170 plastic & rubber enterprises out of 11655 Palestinian enterprises working in the West Bank. Plastic & rubber firms form only about 0.0146% of the Palestinian industrial enterprises. However, about 70% of plastic firms are located in the West Bank (PCBS, 2014: P.65- 69: Table 2-1).

According to the Palestinian Federation of Industries (2009), Palestinian plastic industry is located mainly in Al-Khalil (Hebron) and Ramallah districts in the West Bank. Moreover, in 2011, the Palestinian plastic industry contributed about 0.13% of the aggregate Palestinian workforce employment, and this percentage formed about 0.19% of the aggregate workforce

in the West Bank. In 2012, the percentage of plastic industry contribution had risen to 0.25% from the aggregate Palestinian workforce employment, and in the West Bank was 0.35% of the aggregate employment. Finally, in the year 2013, this percentage dropped to 0.16% in Palestine, but rose to 0.23% in the West Bank, respectively. This variation indicates that the Palestinian plastic industry situation is not normal and needs further investigation and examination (PCBS, 2012: Table 1-1; PCBS, 2013: Table 1-1; PCBS, 2014: Table 1-1).

Concerning the size of Palestinian plastic firms, they employ around 10 workers per firm, and the working labor ranges from five to twenty workers except four factories that employ more than 50 workers. This sector produces an extensive variety of items that include plastic pipes and fittings, sanitation fittings, plastic bags and sacks, different size and multipurpose plastic containers, drinking water containers, polystyrene, rubber and kitchen wear (Palestinian Federation of Industries, 2009).

1.3.2 Technical Position and the Capacity of the Palestinian Plastic Industry

In plastic production, advanced technology has a very important influence on the production process. Production quality is highly sophisticated when advanced technology is employed in manufacturing. For example, large firms that export their products to external markets must meet the international standards. Therefore, they have to invest in imported high technology equipment to produce high-quality products. Also, the introduction of advanced technology allows firms to perform at the minimum average cost, and this gives them a competitive advantage in the international market (Royal, Personal Communication, November 30, 2014).

Existing technology in the plastic industry is concentrated in designing templates or molds for production. Technology gives firms flexibility to keep improving the design of new products despite their high costs (Royal, Personal Communication, November 30, 2014).

Based on PCBS reports, the Palestinian plastic industry operates about 49% of its total capacity and has an extraordinary potential for improvement, expansion, development and diversification of its products. (Palestinian Federation of Industries, 2009).

What distinguishes plastic industry from other industries is that it is characterized by its wide domain of introduction of new products and technologically developed products. This

industry is highly subject to develop new products by firms to new markets when it employs advanced and modern technology (Royal, Personal Communication, November 30, 2014).

However, compared with other industries, the Palestinian plastics industry is still a very small industry. Several efforts are needed in order to keep plastic firms producing of new products to compete with imported products, or by improving, the production processes that make firms produce with more efficiency and lower production costs.

1.3.4 Imports & Exports

Imports of final plastic products, raw materials, and intermediate products accounted only, 2.99% in 2011 of total imports, and afterward this percentage has increased to 3.19% in 2012, and remained constant in 2013. (PCBS, 2014: unpublished data)

This increase in imports could imply that there is an increase in production. However, the majority of plastic firms had increased their imports and stockpiling of raw materials as an issue of the difficulty of importing on time to meet orders of final products (Palestinian Federation of Industries, 2009).

Polymers of ethylene in primary forms, Poly Acetyls, and Polyether are the main raw materials or components for plastic production and this essential material form the largest portion of the raw material. Moreover, during 2011 & 2013, conveyance and packing of goods, plastics, stoppers, caps and other closures formed the second important imports for plastic industries. These imports constituted about 17% of the total plastic imports and used as intermediary products (PCBS, 2011- 2013: unpublished data; PCBS, 2014).

However, it is clear that Palestinian plastic industry relies on intermediary products that may be produced locally to match the local market needs.

According to the exports, the Plastic industry was ranked in the sixth position in the top 10 Palestinian exports during 2002 & 2014, which accounted for 2.1% of the total Palestinian exports (PalTrade, 2013).

Concerning the report of the Palestinian Federation of Industries of the year 2009, the exports of this industry formed only about 8% of total Palestinian exports, and about 10% of its market share is located in the Israeli markets. The local market constitutes the major market

share of this industry; 65% for West Bank, 15% for Gaza Strip and 2% for Jerusalem (Palestinian Federation of Industries, 2009).

In relation to the National strategy of exporting in Palestine for years 2012 and 2013, the Plastic industry formed only about 5% of the total Palestinian exports to the foreign markets. Exporting to Arab and foreign countries requires high-quality products that conform to international standards (PalTrade, 2013).

Thus, it is clear that plastic exports had declined from 8% in 2009 to 5% in 2013. Moreover, this industry is dominated by traditional and straightforward production. Particularly in the year 2013, a large portion of the exports was mainly Polymers of Ethylene in primary forms that considered a basic or intermediate raw material for other plastic industries. Moreover, in the year 2012, exports such as conveyance and packaging goods, plastics, stoppers, caps and other closures formed about 55.13% of total plastic exports. Going back to plastic imports, these goods formed the second important imports of raw materials (PCBS, 2011-2013: unpublished data; PCBS, 2014).

This indicates that local firms produce these products locally instead of importing them from outside. Hence, it is important to improve the quality of Palestinian plastic products in order to have the capacity to compete in the foreign markets.

1.3.5 Production Inputs & Capital to Labor Ratio

Concerning the industrial survey by Palestinian Bureau of Statistics (2014) of the year 2013, a large portion of the plastic industry is concentrated in raw materials and inputs for production, then fuel & oil, electricity, water and other materials. Essential raw materials for production are mainly imported with modern technology to meet the design and keep producing new products (Royal, Personal Communication, November 30, 2014).

In 2011, plastic firms and establishments in the West Bank imported 85.36% of the production inputs that consist of raw materials for production. For example, fuel & oil for production consisted about 4.36% of the production inputs, electricity 6.30%, water 0.17%, and other production inputs consisted 3.98%. In 2013, raw materials for production continued to decrease and consisted of 69.82% of total production inputs, fuel & oil for production consisted about 4.20% of the production inputs. On the other hand, electricity

6.83%, water 0.15% and other production inputs increased to 19% , as clarified in Table (1.1) (PCBS, 2012: Table 2-3; PCBS, 2013: Table 2-3; ; PCBS, 2014: Table 2-3) .

Table.1.1: The amount of production inputs used in million dollars and their percentage of total inputs for years 2011, 2012 & 2013

Year 2011					
Total	**Raw Materials**	**Fuel & Oil**	**Electricity**	**Water**	**Other**
58.533	49.9611	2.5531	3.6894	0.0978	2.3316
Percentage of total inputs	85.36%	4.36%	6.30%	0.17%	3.98%
Year 2012					
Total	**Raw Materials**	**Fuel & Oil**	**Electricity**	**Water**	**Other**
85.161	68.6028	3.162	4.6555	.106	8.6347
Percentage of total inputs	80.56%	3.71%	5.47%	0.12%	10.14%
Year 2013					
Total	**Raw Materials**	**Fuel & Oil**	**Electricity**	**Water**	**Other**
65.990.5	46.0724	2.7746	4.5066	0.0972	12.5397
Percentage of total inputs	69.82%	4.20%	6.83%	0.15%	19.00%

* Source of data: PCBS, Economic Surveys Series – Main Results 2011 – 2013: table 2-2

The table above indicates that costs of local production factors such as fuel, oil, electricity, and water tend to reduce production efficiency. During 2011 – 2012, total sales formed about 98.69% of the total production output where 57.76% of these sales were sold in the local market, and the other portion (42.24%) were exported to foreign countries as clarified in Table (1.2) (PCBS, 2012: Table 2-5).

Table 1.2: total production, total sales, local sales & exported products in million dollars and their percentage of total sales for years 2011, 2012 & 2013

Year 2011				
Total	**Total Sales**	*Local****	*Exports****	**Unsold****
85.1217	84.0062	48.520	35.4862	1.1155
	98.69%	57.76%	42.24%	1.31%
Year 2012				
Total	**Total Sales**	*Local****	*Exports****	**Unsold****
145.8985	143.7351	115.8348	27.9003	2.1634
	98.52%	80.59%	19.41%	1.48%
Year 2013				
Total	**Sold**	*Local*	*Exports*	**Unsold****
124.5339	124.0499	N/A	N/A	0.484
	99.61%			0.39%

* Source of data: PCBS, Economic Surveys Series – Main Results 2011 – 2013: table 2-6
** Calculated by the researcher
*** Percentage of local and exported products from total sales

According to the capital to labor ratio for plastic industry in the West Bank, it was 19.21% (0.1921) in 2011, 25.37% in 2012, and 9.25% in 2013 (PCBS, 2011; PCBS, 2012; PCBS, 2013: Table 2-1). Table (1.3) displays the capital-to-labor ratio for years 2011, 2012 and 2013, respectively. During 2011 - 2013, it is clear to conclude that Palestinian Plastic industry is labor-intensive one. However, this ratio was sharply decreased in 2013, which means that there is a lower labor productivity because the labor is working with relatively less capital.

Table 1.3: Capital-to-labor ratio

Year	Number of Employed Persons	Compensation of Employees in million US dollars[5]	G. F. C. F. in million US dollars**[6]	Ratio
2011	1561	7.5697	1.454	19.21%
2012	1979	11.5302	2.9252	25.37%
2013	1367	9.2186	0.8523	9.25%

Source of data: PCBS, Economic Surveys Series – Main Results 2011 – 2013: table 2-1

1.3.6 Statement of the Main Problems and Needs of Plastic Industry

It is obvious that Palestinian plastic industry needs to be revived. Competitiveness among producers and fair treatment of legally licensed firms ought to be upgraded and enhanced by organizing the local market. Moreover, this industry suffers from high costs of local inputs like expense infrastructure, taxes, and raw materials. The high cost of machinery and maintenance are considered the two major problems facing this industry. Moreover, a large portion (95%) of raw materials included in the plastic industry were mainly imported from abroad, and only about 5% of raw materials were purchased from the local market (Palestinian Federation of Industries, 2009; Sabri, 1999).

The quality of outputs is one of the greatest interests of this industry that related mainly to food packaging materials. For other products, quality is a matter of increasing the

[5]**Compensation of Employees:** Indicator measures the total value of cash and kind wages in enterprises, including social security contributions, which is paid to any employee for work performed.

[6]**Gross Fixed Capital Formation:** Gross fixed capital formation consists of the value of producers' acquisitions of new and existing products of produced assets less the value of their disposals of fixed assets of the same type.

competitive advantage in the local markets. This sector is distinguished as high competitive in the local markets and less powerful with imported products because of the price considerations (Palestinian Federation of Industries, 2009). For this reason, quality and cost problem could be solved by performing innovations because it is the key element that could increase the efficiency and competitiveness of that sector. Based on the national standards, the Palestinian Plastic industry needs to confirm and certify its products quality that is characterized by the usage of low technology, no brand names used, and lack of maintenance for machines and equipment. Firms in this industry do not acquire a certificate, but they have to develop and create more solid, reliable, and easy operational techniques to guarantee a higher rate of quality. In addition, most of the firms lack skilled labor, and they ought to consider better approaches to reduce the energy consumption rate and in particular, the total production costs where electricity is the major component of costs and deserves critical criticism to minimize production costs (Sabri, 2009; Palestinian Federation of Industries, 2009).

Based upon an interview with the biggest plastic firm in Palestine (Royal, November 30, 2014), the major obstacles that threaten the Palestinian plastic industry are:

I. The most important and major problem is the lack of raw materials. Raw materials that are necessary for production are not produced locally, but they are imported from foreign countries. Nevertheless, the difficult circumstances and critical political situation lead to delay the deliveries of raw materials on time.

II. There is a lack of competencies and human capital with prior skills and expertise in this field. Moreover, no university graduates with scientific and practical expertise in this field are employed in this industry. However, most of labor and graduates start from scratch in learning the methods of production. The reason behind this that Palestinian universities lack training centers for graduates, and lack integration programs with the industry through the purchase of necessary equipment for training students in order to get the necessary experience before hiring them.

III. Moreover, there are obstacles and difficulties in the processes of manufacturing and marketing. In general, everyday there is a new product developed by using new production techniques, which local firms are required to cope with the changes in products or to produce new products as a result of the rapid changes in customers' needs and attitudes. This forced the major companies to change their production

templates or molds, which are very expensive. Thus, performing changes to the products or production processes are costly and require a bulk amount of money.

IV. The plastic industry needs a very intensive capital to produce sophisticated products.

V. According to the external threat in receiving imports on time, production costs could be reduced if raw materials could be produced locally or imported at large scale on time. Moreover, this industry is prone to a threat from imported small plastic and raw materials.

VI. Plastic firms do not aspire innovations or creativity, but rather they rely on traditional techniques and old equipment. For example, most plastic firms buy equipment and machines and keep using them for a long period (10 years and above), and remain producing traditional products without any developments.

1.4 Study Problem

The Palestinian plastics industry in the West Bank is one of the industries that are declining because of the very strong competition from imported goods. Due to the fact that the application of innovations help firms to compete with these imported goods, this study is concerned about innovation because it enhances the exports by improving the products quality and reducing the production costs. This, in turn, would help to reduce the volume of imports, which lead to an increase in the GDP.

Based on the previous sections, the main problems that this study will shed light on are:

1. There are no previous studies about the plastic industry.
2. Previous literature about innovation in Palestine is very scarce.
3. The industrial sector in Palestine is experiencing growth, but the plastic industry is facing a sharp decline.
4. Plastic industry plays an important role in life because plastic versatility enables firms to contribute to the innovation of our industries. However, the Palestinian plastic industry is not a national priority.

5. The Palestinian plastic industry is a labor-intensive one that produces final and intermediary products, which require a substantial amount of labor to produce. Labor-intensive industries are highly related to the traditional industries such as agriculture. This indicates that there is a lack of capital in this industry, which means that this industry operates with very low technology.

1.5 Purpose of the Study

This study aims to provide a useful solution that could develop the Palestinian plastic sector through employing innovation. To come up with such solutions, this study provides a wide description of the situation of the Palestinian plastic industry. It investigates the different styles of innovation influences that are expected to enhance growth and productivity in this industry to provide policymakers, firms, stakeholders, executives, investors and businesspersons to figure out how to improve the industry through employing innovation.)

Focusing on the plastic industry was selected because this industry is ignored and facing challenges in both local and external markets. Thus, this industry should be improved and developed because creativity and innovation in this industry are very broad for performing product and process innovations.

1.6 Justification

Nowadays, due to the importance of the subject of creativity and innovation and the scarcity of studies related to the subject of innovation and plastic industries in Palestine, this study is considered the first of its kind in Palestine on the scope of the research. This research is important for the following reasons:

1. Innovation is the source of competitive advantage where companies must innovate in order to stay in the market through succeeding and upholding high standards of quality & operations (Matthews, 2003; Glasberg & Ouerghemi, 2011).
2. The competence in the international market creates a challenge for companies to become innovators. Therefore, by adopting innovated activities, Palestinian firms will

be able to penetrate into foreign markets (Yeh-Yun Lin & Yi-Ching Chen, 2007; Kalyani, 2011; Karasek, 2012).

3. Innovation allows firms to enter into new markets and make new products. It becomes easier for exporting firms to benefit from the innovative knowledge that is not available for domestic firms (Karasek, 2012; Bocquet & Musso, 2011).
4. Innovation is a vital element for firms to grow, and to reduce the unemployment rate (Pianta, 2005; Meriküll, 2008; Zimmermann, 2008; Wallner & Prauhart, 2012).
5. Innovation enhances the firm's performance in terms of production, employment, sales, and exports. In addition, it contributes significantly to growth (Yeh-Yun Lin & Yi-Ching Chen, 2007; Cameron 1998; Grabowski et al., 2013; Hassan et al., 2013; Rosli & Sidek, 2013; Cameron 1998).

1. 7 Study Questions

This study addresses the subject of innovation in the Palestinian plastics industry through independent study factors that affect innovation in the Palestinian environment. In addition, this study sought to determine the impact of innovation on several different aspects through answering the following questions:

1. Where is the innovation in the Palestinian plastic industry?
2. What type of innovation do Palestinian firms tend to perform?
3. What type of innovation did Palestinian firms adopted recently?
4. What are the key factors that positively induce innovations in the Palestinian industry?
5. What are the barriers and obstacles that deter innovation?
6. What are the outcomes of innovation?
7. Which type of innovation has more significant outcomes?

Chapter 2

Literature Review and Theoretical Framework

Based on the research problem, this section will report the results of previous literature where the relationships between the variables are discussed in detail at the end of this chapter.

2.1 Innovation as the source of competitive advantage and growth

Nowadays, in this globalized world, companies must innovate in order to keep competing in the market. Therefore, the development of knowledge and the nature of the market have increased the emphasis on innovation (Matthews, 2003; Glasberg & Ouerghemi, 2011).

In dynamic environments, innovation is the proper mechanism for organizations to adapt because it is central to productivity and helps to drive economic growth (Hurley & Hult, 1998; OECD & Eurostat, 2005; OECD, 2012),

Competing in the international market has created a challenge for firms to become more innovative because innovation is a dominant, important factor, and a prerequisite for firms, organization and nations to adopt continues change, success in maintaining competitiveness, uphold high standards of quality and operations worldwide. Without innovation, the enterprise, and what it provides will become soon obsolete. Also, innovation is not limited or restricted to one or certain sectors of the economy, but it can occur in any sector (Yeh-Yun Lin & Yi-Ching Chen, 2007; Kalyani, 2011; Karasek, 2012; Okpara, 2007; OECD & Eurostat, 2005).

Despite the different definitions of innovation, most studies agreed upon the same meaning, where creating or establishing something new based on existing thing (Lukić, 2012; Jenssen

& Nybakk, 2009; Matthews, 2003; Kim & Nelson, 2000, Okpara, 2007; Calantone, Cavusgil, Zhao, 2002, OECD & Eurostat, 2005; UNECE , 2012).

2.2 Definition of Innovation

Most studies agreed upon that innovation is coming up with new thing (products, processes, and services) based on existing thing, knowledge or idea, which it leads to new products or services that are higher in quality and lower in price. (Lukić, 2012; Jenssen & Nybakk, 2009; Matthews, 2003; Kim & Nelson, 2000, Okpara, 2007; Calantone, Cavusgil, Zhao, 2002, OECD & Eurostat, 2005; OECD, 2009; OECD, 2012; UNECE , 2012; Rose et al. , 2009).

Lukić (2012) defined innovation based on the Schumpeterian definitions of the entrepreneur who is an innovator or creative destructor, and on Drucker's definition as the person who maximizes the business opportunity. Jenssen & Nybakk (2009) argued that innovation is the ability to create something new. According to Drucker (as cited in Matthews, 2003), innovation includes the change of existing products and procedures, discovering new ways of production and the dismissal of the old on a regular basis (Matthews, 2003).

Moreover, Okpara (2007) defined innovation as the process of adding something new to an existing product or process where innovations do not involve inventions but are deeply based on existing ideas. Thus, to turn an idea into innovation, it has to be widely accepted and included in the daily lives of people (Kim & Nelson, 2000; Okpara, 2007).

With regard to UNECE (2012), it defined innovation as the operation of transforming the invention into a product or service that can be marketed and sold in the market. This continues of commercialization is the key element in fostering the innovation process that leads to economic growth.

According to the definition of OECD & Eurostat (2005) as mentioned in the third edition of the Oslo manual:

"An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations."

Hence, the result of innovation is to get values in the market through the process of developing or producing a new product, services, or processes that generate above-average returns as additional capital. These returns allow firms to reinvest in innovative activities that give them a competitive advantage in the marketplace (Kalyani, 2011; Lukić, 2012; Deloitte, 2005).

In general, innovation describes the process of coming up with new products, processes and services provided by firms in order to come up with a new product, improve the quality of existing products or to reduce the cost. This, in turn, contributes positively to influence the firm's performance, economic growth and substantially to its competitive advantage or may cause a commercial process (Lukić, 2012; Matthews, 2003; Rosli & Sidek, 2013; Rose et al., 2009).

Moreover, many consented upon that innovation is the key element for success and prosperity. Enterprises need to improve their existing products and services to grow and prosper through continuous innovations. Therefore, a business that performs innovations are more successful than non-innovative ones (Okpara, 2007; Han et al., 1998; Knowles et al., 2007; Rogers, 2003; Wheelwright & Clark, 1992, as cited in Jenssen & Nybakk, 2009).

Yeh-Yun Lin & Yi-Ching Chen, (2007) argued that companies do not compete in terms of innovation, but compete to transform innovations into competitiveness. To sum up, innovation is the process of developing or creating something new with economic value.

Innovation occurs when the firm introduces new products or processes, then followers in the industry imitate these products or processes that have already been developed (Pianta, 2005).

Kim & Nelson (2000) differentiated between "Imitation" & "Innovation". They authors stated that "Imitation is a reverse engineering of existing foreign technologies." However, "Innovation is defined as a pioneering activity, rooted primarily in a firm's internal competencies, to develop and introduce a new product to the market for the first time." Imitation (reverse engineering) does not require an investment in R&D when simple products are being produced; it requires only a low level of learning when the firm cannot generate knowledge. Thus, firms that invest in innovation inputs such as R&D, training or machinery and equipment are more likely to be product innovators (Kim & Nelson, 2000; Bocquet & Musso, 2011).

Innovation can occur at different organizational levels: individual, team, or organizational level. From an organizational point of view, innovation resides in the market where developing innovative marketing activities are necessary to help organizations to turn good ideas and products into sales, revenue, and profits. However, innovation is not always associated with the creation of a revolutionary technology, which introduces a brand-new product; it may be reflected in the up-market movement and increase the benefit of existing products (Glasberg & Ouerghemi, 2011; Yeh-Yun Lin & Yi-Ching Chen, 2007; Sakala & Kolster, 2014). UNECE (2012), categorized innovation into three groups according to its novelty:

1. New to the world.
2. New to the market.
3. Disruptive innovation that leads to radical innovations.

According to the third edition of the Oslo Manual, there are three concepts for innovation novelty: new to the firm, new to the market, and new to the world (OECD, 2009; OECD & Eurostat, 2005).

2.3 Innovation Activities

According to OECD & Eurostat (2005), innovation activities include the purchase of capital, R&D expenditure, or investments that could yield future returns. These activities could be done within the boundaries of the firm or may involve the acquisition of goods, services or knowledge from external sources, and could include R&D activities that are financed or performed by the firm or the enterprise. Moreover, for implementing product or process innovations, firms require training their staff, which is considered a product or processing innovation activity.

As claimed by Huang, Arundel & Hollanders (2010), innovations constitute and require a wide range of activities that need to increase the stock of knowledge. The application of acquired knowledge is a necessary condition to create new or improved products and processes. These new products, processes and improvements could be achieved through the acquisition of new technological processes, additional engineering productivity, and combined existing knowledge in new ways and investment in R&D.

The third edition of the Oslo Manual defined innovation activities as:

> "Innovation activities are all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative, others are not novel activities, but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation." (OECD-Eurostat, 2005)

This study will deal with the innovation activities as elements or factors that determine innovations.

2.4 Innovation in developing countries & Problems of Innovation

In developed countries, many institutions, firms, and organizations support innovation in addition to the work of the framework that protects intellectual property rights. However, in the developing countries, the situation is completely different. Significantly, there is a lack of the institutions and networks that support innovation due to the unavailability of a strong technological base for the promotion of scientific research and development (R&D). Therefore, these countries continuously suffer from the lack of political and economic stability, such as low growth rate of GDP per capita, underdeveloped infrastructure, very low spending on R&D processes and the lack of coordinated policies to support the national economy. These developing countries suffer from unstable environments, immature market structure, or lack of resources. Moreover, these developing countries are characterized by a traditional process of production that relies on cheap & intensive labor. Therefore, as a result of the economic and political abnormality in the Palestinian territories, knowledge, research and innovation are the most important and necessary elements to survive the Palestinian economy (Khatib et al., 2013).

Despite the positive impact of innovation, it is a costly procedure and only recognized when the benefits received exceeds the costs of innovation. Moreover, firms could experience a lag between the innovation and its benefits, and there is no guarantee of success in innovation because it is a risky activity (Rosli & Sidek, 2013; Jenssen & Nybakk, 2009).

In Palestine, the most prominent obstacle to innovate is the high cost of innovation, due to the lack of internal and external funds. In addition, R&D in the developing countries is almost minimal. Also, Palestine lacks the appropriate educational system and infrastructure,

which are the main components to create an innovative ecosystem (Khatib et al., 2013; Wallner & Prauhart, 2012).

2.5 Types & Patterns of innovation

Many studies dealt with innovation as different types or categories, but not all the types have the same impacts or determinants (Jenssen & Nybakk, 2009; Nybakk, 2012; Toner, 2011; Yeh-Yun Lin & Yi-Ching Chen, 2007; Rosli & Sidek, 2013; Pianta, 2005; OECD-Eurostat, 2005; UNECE , 2012).

UNECE (2012) divided innovation into two different forms; product innovation & process innovation. Also, the third edition of the Oslo manual distinguished between four types of innovations: product innovations, process innovations, marketing innovations and organizational innovations (OECD-Eurostat, 2005; OECD, 2009). However, Toner (2011) divided Innovation into radical and incremental based on the processes used and the results of operations.

According to product and process innovations, they are closely related to the concept "technological innovation," which consists of technological product innovation and technological process innovation (OECD & Eurostat, 2005). The following types of innovations are outlined below:

I. **Product Innovation**: OECD & Eurostat (2005) defined product innovation as:

> "A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics."

However, product innovations are based on the acquisition of new knowledge, technologies, intermediate goods that are utilized, or by using a combination of existing ones that will finally result in radical or incremental innovations (OECD-Eurostat, 2005; Pianta, 2005).

Product innovations increase the demand that in turn increases investment and employment rate. Also, product innovations usually linked with a looking for technological competitiveness that based on high productivity (Okpara, 2007; Pianta & Vaona, 2006).

To summarize, the term "Product innovations" refers to the procedure of making or introducing a significantly new or improved commercial product or service based on existing product or knowledge.

II. **Process Innovation:** OECD & Eurostat (2005) defined process innovations as:

"A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software."

Thus, process innovation is the procedure of improving established production method or creating a new one. It leads to a more efficient production of specific products, price reduction and contributes to investments in new technology. A firm could be innovative in improving its processes of production to reduce the costs, but it is not necessary that the firm had introduced new products (Jenssen & Nybakk, 2009; Pianta & Vaona, 2006; Nybakk, 2012; Rosli & Sidek, 2013).

Process innovations could lead firms to cut their production costs with respect to competitors; firms compete when they provide better or cheaper products that their customers can take advantage of, and difficult for their rivals to copy. Moreover, process innovations increase the productivity, quality of products and lower the production cost (more quantity over fixed and variable costs for units produced) and helps to increase demand. In addition, process innovations mainly arise from active price competitiveness strategies that are dominated by search efficiency, where productivity growth is rooted in capital-intensive developments (UNECE , 2012; OECD-Eurostat, 2005; Okpara, 2007; Pianta & Vaona, 2006).

To summarize, the term "Process innovations" refers to the procedure of implementing or developing a new way or method of production or providing the service, which the main result of process innovations is to reduce the cost of production that leads firms to achieve a cost advantage.

Concerning the main difference between product and process innovations is that product and process innovation have different characteristics that may affect how they are developed (Huang, Arundel & Hollanders, 2010).

Bogers (2009) argued that the determinants & impacts of process innovations are fundamentally different from those of product innovation when the first one would take place

on the production floor rather than in R&D. In relation to Kirner, Kinkel & Jaeger (2009), in manufacturing firms, product and process innovations can be tangible or intangible products where tangible process innovations include organizational or technological aspects.

As claimed by Rammer, Czarnitzki & Spielkamp (2008) the purpose of product innovation is to enhance the firm's market position, which depends mainly on the degree of novelty. On the other hand, process innovation is the successful introduction of new methods that basically end in a reduction of the cost of units produced, and an increment in the quality of production processes. This increase in quality can allow firms to differentiate their products that positively influence the firm's competitiveness.

III. **Marketing Innovation:** OECD & Eurostat (2005) defined marketing innovations as:

"A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing."

Market innovation is the process of penetrating a new product to unfamiliar markets. Hence, the company that wants to reach potential customers from all over the world at high speed should do continual marketing innovations. Marketing Innovations' main goal is to meet the customer's needs, open up new markets or new product positioning of the company in the market in order to increase the sales (Jenssen & Nybakk, 2009; Rosli & Sidek, 2013; OECD & Eurostat, 2005).

Hassan et al. (2013) concluded that marketing innovation guide to product innovation while product innovation is a major driving force for process innovation.

To sum up, the term "Marketing Innovations" refers to the procedure of creating new marketing methods or the process of infiltrating into new markets where the main purpose from marketing innovations is to increase the firm's sales and market share.

IV. **Organizational Innovation:** Matthews (2003) defined organizational innovation as the process of creating idea or behavior that is new to the organization. OECD & Eurostat (2005) defined Organizational innovations as:

"An organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations."

Organizational innovation improves the performance of the company by reducing administrative costs or transaction costs, improving workplace satisfaction, productivity, access to non-traded assets, or reducing costs of supplies (OECD & Eurostat, 2005).

Hence, the term "Organizational innovations" refers to the procedure of creating a new way of management or behavior in the firm or workplace where the main purpose of this type of innovation is to increase the firm's performance and reducing the firm's transactions and administrative costs.

Besides the previous four types of innovations, various studies divided innovations into two patterns or categories: radical and incremental innovations with respect to the output in the market.

1. Radical Innovations: is an innovation that creates major disruptive changes or delivers substantial impact on the market and on the economic activity of firms in the marketplace, which focuses on the impact of innovations as opposed to their novelty (Schumpeter, 1942).

Radical innovations are innovations that lead to major technological, economic, and social changes. These types of innovations are characterized as disruptive, affect multiple industries, subject to great uncertainty, and take a long time for the market opportunities to be exploited (Toner, 2011).

2. Incremental Innovations: is an innovation that concerns improvements or partial changes on existing product, service, process, organization, or method through using advanced materials, machines or components (OECD, 2012).

Incremental innovations are the prevalent type or form of innovations. It includes minor changes and improvements to existing products. In fact, it involves gradual changes in the products, services, processes and organizational structures, which is the predominant form of innovation. Incremental innovations use existing technologies and standards for the implementation of improvements to existing products and services. Moreover, incremental innovations can be applied in a wide range of enterprises, which are the major source of productivity growth in the economy (OECD, 2012; Toner, 2011).

3. Main differences between radical & incremental innovations: Product innovations could be incremental or radical innovations. Both of them are developed through internal and external innovative activities through improving the quality and diversity of products.

As a result, this could open up new opportunities for firm's new markets through producing large quantities and/or producing cheaper products (Pianta & Vaona, 2006).

Yeh-Yun Lin & Yi-Ching Chen (2007) found that both incremental and radical innovations are caused by technological, marketing, administrative, and strategic innovation but with some differences. The main difference between radical and incremental innovations is that: while radical innovations introduce new products to the world, incremental innovations are concerned with modifications and improvements on existing products. Moreover, these two patterns of innovation are closely related and interlinked, and they exist together in many innovative firms (Yeh-Yun Lin & Yi-Ching Chen, 2007; Pianta, 2005; Pianta & Vaona, 2006).

2.6 Major Drivers of Innovation

Wallner & Prauhart (2012) introduced some structural elements and initiatives that lead to the establishment and development of an innovation ecosystem in Palestine, and these elements are Infrastructure, Infostructure, Intellectual Capital, Interaction, Integrity Systems, Incentives, and Institutions.
According to Zemplinerová & Hromádková (2012), the following factors are expected to affect innovation such as firm age, size of the firm plus strategic features such as membership in a group or focus on foreign markets, barriers in financing of innovation, the level of market competition, economic situation of a country, R&D subsidies, etc.

Most of the studies about innovation crossed with these elements, which defined six main drivers or influences of innovation: creativity, knowledge, linkages, environment (culture) and access to finance.

2.6.1 Creativity and Innovation

Lukić (2012) defined creativity as the ability to discover and identify problems, and to develop ways to solve these problems. According to Okpara (2007), creativity is the ability to bring into existence new method, device, artistic object, form, or solution to a problem.

Both agreed upon that creativity is the way of coming up with a new solution to solve recognized problems.

Others agreed that creativity is the process of generating ideas that are necessary for innovation. Glasberg & Ouerghemi (2011) argued that creativity generates new ideas that are necessary for innovations, so employees or individuals within a firm must be creative to conduct innovations. Thus, creativity is the process of making things that no one else has ever made. It is the power of innovation because it involves the end of the old ways

Innovation and creativity are two driving forces behind the entrepreneurial process. Innovation requires creativity, but not always creativity result in innovation. Creativity is essential for innovation, but not a sufficient condition; it is the ability to create, call into existence something new, and the ability to generate new ideas or to change the existing ones. Because innovation is interrelated with creativity, it must be a formal requirement of the work to improve the degree of innovation. Hence, innovations require eligible employees to creatively think about the problems that arise. Therefore, organizations must track the frequent generation of ideas and the role of these ideas in innovation processes (Lukić, 2012; Parzefall, Seeck & leppänen, 2008; Okpara, 2007; Kalyani, 2011; Glasberg & Ouerghemi, 2011).

2.6.2 Linkages

Firms need to establish linkages inside and outside their cluster in order to acquire a constant inflow of new knowledge. OECD & Eurostat (2005) reported that linking sources of information, knowledge, technologies, and practices, human and financial resources are vital for innovation. Those linkages or communications act as sources of knowledge and technology for the innovative enterprise, ranging from passive sources of information to suppliers embodied and disembodied knowledge and technology cooperative partnership (Svetina & Prodan, 2008; OECD & Eurostat, 2005).

These linkages could be tied with universities, competitors, policy departments, government laboratories, regulators, suppliers, and customers. Also, these linkages could be internal to the unit or external (OECD & Eurostat, 2005).

In this study, linkages are divided into external and internal linkages:

1. External Linkages: Establishing external ties or networks in the external environment to enhance innovation with other firms and organizations is a major issue for obtaining knowledge, information, and ways of production. Those external relationships make it possible to flow necessary knowledge inside firms from external ones to promote innovations.

As claimed by Svetina & Prodan (2008), advanced knowledge could be obtained from establishing connections with other firms and other actors. In fact, firms have to cooperate with other firms, suppliers, customers, knowledge institution and even with its competitors.

Jenssen & Nybakk (2009) defined "External Relations" as the "all kinds of formal and informal relations developed for the purposes of exchanging and sharing human capital, finances, knowledge and physical goods, and all kinds of joint ventures undertaken in order to gain competitive advantage, reduce risks and/or achieve economic success."

The benefits of these linkages or connections depend on knowledge and technologies both together, which are shared across the enterprise to develop and produce new products, processes, and other innovations (OECD & Eurostat, 2005).

For Exporting firms, they cannot simply depend on their inner capabilities and strategies. They have to explore how to benefit from the competencies that exist in the market (Lages, Silva, Styles, 2009).

Zemplinerová Hromádková (2012) found that firms, which deal with export markets, are more innovative and make greater innovation investments to remain competitive.

Firms collaborate among themselves and with research institutions or universities in order to acquire external knowledge. Collaboration between firms and other institutions is necessary to exchange knowledge between them. Moreover, in order to increase the quality of innovations, it is important to take part in international R&D networks and technology transfer to obtain knowledge, acquire foreign finance and investment. Establishing external relationships makes it possible for the firm to share knowledge and other resources with other firms. Moreover, networking and cooperation between firms can provide the necessary resources to innovation (UNECE, 2012; Jenssen & Nybakk, 2009; Svetina & Prodan, 2008).

De Jong & Vermeulen (2004) found that in manufacturing firms, the innovation plans, and inter-firm cooperation found to be significant drivers of product introductions

Svetina & Prodan (2008) found that the cooperation with international firms or partners contributes mainly to innovation because local sources of knowledge are important to a certain extent.

Establishing joint innovation projects allow firms to access and gain new knowledge and technology that are unable to use on their own. Moreover, firms can do a joint development of new products, processes or other innovations through the cooperation with supply chains and customers. In addition to that, firms can involve in horizontal collaboration with other firms that work jointly with other public research institutions or other enterprises (OECD & Eurostat, 2005).

External relationships and networks with other firms are established by forming alliances and collaborations.With relation to Svetina & Prodan (2008), inter-firms collaborations are not restricted to the local level and clusters, but could be expanded into international levels to engage in global networks. This international interaction will provide the firm with access to information on rapidly changing technologies and market opportunities and foreign relations. Moreover, it is necessary to carry out alliances with other firms and involvement in foreign relations in a rapidly changing knowledge economy. These alliances increase the size of the company and maintain a certain degree of autonomy at the same time, and allow companies to achieve economies of scale, as a group and maintain its autonomy (Svetina & Prodan, 2008; Yeh-Yun Lin & Yi-Ching Chen, 2007).
Firms can establish external networks and relationships with their external environment by allowing customers, suppliers, and other agents to participate in the process of innovation. It is important to involve customers and suppliers in innovation efforts with the potential to create new products, markets, and processes. Thus, firms that develop products with respect to customers' specifications are better in introducing product innovation. This could be done by interacting with clients, and developing flexible customer-oriented solutions that require high levels of skills and a close relationship with customers to adapt more successful innovations. (Jenssen & Nybakk, 2009; Kirner, Kinkel & Jaeger, 2009).

Calantone, Cavusgil & Zhao (2002) argued that it is necessary to take feedback from customers, suppliers, and competitors in order to be used in developing core competencies. The interaction between the manufacturer and products users is necessary for the innovative process (Svetina & Prodan, 2008).

Lages, Silva & Styles (2009) argued that it is important to build up strong relationships with importers because they can provide the firm or the exporting agent with experimental knowledge about export or foreign market, and that can help and improve to transform the tacit knowledge into explicit knowledge that contributes to economic performance.

The combination of relationships with the environment is a key factor for success. Therefore, establishing relationships between environment and organizations help the firm in gaining ideas that are necessary for innovations and economic performance (Matthews, 2003; Birley, 1985; Burt, 1992; Goes & Park, 1997; Granovetter, 1973; Hall, 1982; Jenssen, 1999; Minzberg, 1979; Tushman, 1977; Tushman & Scanlan, 1981, as cited in Jenssen & Nybakk, 2009).

According to the influence of external relationship on innovation, Jenssen & Nybakk (2009) argued that suppliers possess knowledge that could be utilized in the company, which leads to product or process innovations. The authors found that market participates in product development, and systematic environmental scanning have a significant influence on product and process innovation. Thus, the organization has to allow suppliers or customers to participate in the development process (Parzefall, Seeck & leppänen, 2008).

In addition to that, Jenssen & Nybakk (2009) found that external networking (relationships) are important to innovation in small, knowledge-intensive firms where external relations have a positive influence on innovations in small, knowledge-intensive firms. Moreover, the authors found that the interaction of the top management with other firms and with external R&D positively affects market innovations and product innovation, respectively. That means, in the context of high-tech products or knowledge-intensive products, access to R&D resources is very important for product development. In addition to that, the authors also found that the participation in courses and business specific networks are positively associated with innovation. Nevertheless, no evidence was found about the impact of inter-firm co-operation in technology acquisition on innovation.

2. Internal Linkages: it is important to build up internal relationships, networks, and cooperation between workers because these kinds of ties contribute to the exchange of knowledge and experience among the staff (Urbancová, 2013).

Bogers (2009) found that the relationships between workers are highly important and lead to develop process innovations. Consequently, it is important for the top management to behave in relation to innovation with employees (Jenssen Nybakk, 2009).

Mazzarol (2002) concluded that it is important to establish a high level of commitment or partnership between employees and owner-manager. Moreover, firms can encourage the cooperation among employees to create and implement new ideas through creating an appropriate environment that empowers its employees. Informal networks can provide information channels that are superior and efficient than the formal networks that include reporting structure and the official notice board. Those informal networks can be built through personnel collocation and job rotation (Deloitte, 2005; Matthews, 2003).

2.6.3 Finance

According to a study done by Grabowski et al. (2013), about the government support for innovation at Firm-level in Turkey and Poland. In Poland, the author found that the government support for R&D activities, contribute more significantly to the innovation performance than human resources upgrading and grant for investment in new machinery and equipment. They concluded that in order to improve the chances of firms to introduce product innovations, the government has to support the firms' innovation spending. Nevertheless, Zemplinerová & Hromádková (2012) indicated that access to national subsidies has a significant negative influence on innovation output.

Molero & García (2008) found that funding for basic research and cooperative activities has a positive effect on products and processes innovation. However, public funds were found to be positive for product innovation and negative for process innovation. On the other hand, Zemplinerová & Hromádková (2012) found that high cost of financing innovations affects innovation investment negatively. That could result from the low expected return of technological R&D financing, the inability to gain appropriate profits, uncertainty, and risk associated with the project.

2.6.4 Knowledge

Knowledge is a certain axis for innovations, because it is the tool for generating innovations, which involves the application of knowledge. Thus, in order to survive, innovate, grow, and prosper, it is important to access the right knowledge (Urbancová, 2013; Jenssen & Nybakk, 2009; Rose et al., 2009).

In relation to Matthews (2003), in innovative firms, knowledge management is a key role for innovations because the benefits that are derived from knowledge provide firms with the ability to acquire technical core competencies for managing the entire firm, with special emphasis on R&D.

According to Lin (2007), sharing knowledge contributes to the introduction of new ideas, processes, products, or services. It is the process of combining ideas and knowledge together into a new value. The relationship between innovation and knowledge is a way to increase knowledge and to transfer it inside the organizations. In fact, knowledge exploitation and transformation allow firms to avoid costly mistakes and solve problems faster, which lead to a faster capability to solve problems and to improve the rapid response to new information (Okpara, 2007; Matthews, 2003; Jenssen & Nybakk, 2009; Lin, 2007).

Knowledge sharing takes place at the individual and organizational levels (Lin, 2007). Toner (2011) found a strong interaction between the circular and cumulative knowledge, skills, and innovation. Moreover, retrieval and processing of information allow firms to make new kinds of relationships and joint projects (Jenssen & Nybakk, 2009).

Rose et al. (2009) indicated that innovative activities arise from the use of intangible assets, which integrate knowledge, skills, technologies, and the commercialization of product and process innovations.

Based on Svetina & Prodan (2008), they agreed upon that the relationship between knowledge sources and firm's innovative performance has been tested empirically to a limited extent. They found that the usage of internal and external sources of knowledge had a positive contribution to firm's innovation.

Matthews (2003), identified several types of knowledge that could be acquired by firms such as customer knowledge, knowledge related to products and services, customers, processes and organizational memory.

Knowledge is highly related to R&D. Kirner, Kinkel & Jaeger (2009) found that firms which increased their intensity of innovation expenditures, had spent more on R&D, but firm in catching up countries and low manufacturing industries had increased their spending on non-R&D innovation activities as their innovation intensity increases. Concerning to the Palestine Economy, it is still a weak economy that depends on non-R&D activities to innovate. Thus, because the unfamiliarity of R&D between the majority of Palestinian firms,

in this study the concentration will focus on adopting technology and non-R&D activities to acquire new knowledge for innovation.

Sharing and acquiring knowledge can be obtained from external or internal sources:

1. **External Knowledge**: While large firms own R&D, production, marketing and organizational department in transferring knowledge, the small and medium-sized firms need to obtain knowledge from external sources. External knowledge can be divided into local, national, and international sources. Moreover, SMEs can invest in less costly and risky activities to innovate through the usage of external sources of knowledge (Svetina & Prodan, 2008; Rammer, Czarnitzki & Spielkamp, 2008).

Firms have to share their knowledge with other firms and organizations in order to effectively increase their knowledge. External knowledge is important for firms because it allows firms to absorb new information and transform it into innovations, and allows skilled labor to recognize opportunities and manage necessary changes. The absorption of existing knowledge from the external environment through knowledge networking will create new knowledge through creative thinking, exchanging of ideas, accelerating the dissemination of ideas (Svetina & Prodan, 2008; Levinthal & Cohen, 1990, as cited in Jenssen & Nybakk, 2009; Matthews, 2003).

As discussed previously, one way to allow firms to gain external knowledge is to participate in courses and conferences. These courses and conferences are important because it allow staff from different companies to create opportunities for sharing knowledge, and attract staff, workers, and specialists from different organizations.

Innovative activities can be supported through obtaining information from competitors and open sources such as journals, meetings, and professional conferences. This information may replace in-house R&D or create spillovers that lead to new technological opportunities, to enhance the benefits of conducting in-house R&D (Huang, Arundel & Hollanders, 2010).

Svetina & Prodan (2008) found a positive relationship between local and international sources of knowledge and firms' innovation performance.

Process innovations sometimes require the involvement of external suppliers and can often include innovative activities that do not require R&D, such as the purchase of advanced machines, computer hardware, and software, the acquisition of patents or licenses, the investments in training and other procedures. Moreover, it is necessary to obtain information

about the customer's needs optimally, and both market research and the use of networks that can provide such valuable ideas. Firms can use their customers and suppliers as a source of innovations and knowledge from other organizations, competitors and public research (Huang, Arundel & Hollanders, 2010; De Jong & Vermeulen, 2004; Rammer, Czarnitzki & Spielkamp, 2008).

Jenssen & Nybakk (2009) found that systematic environmental scanning has a positive effect on product innovation. This scanning allows firms to understand the new trends in the environment, which help firms to recognize the potential of innovation, learn customer preferences and keep up-to-date with technological developments and information about their competitors. Moreover, scanning the environment can be done by adopting a market research that is a driver to new product introductions because it helps firms to assess the status of unsatisfied customers, which is the key of incremental product introduction (De Jong & Vermeulen, 2004).

Another way of gaining new knowledge from external sources, is through the participation in courses, business networks, and conferences (Jenssen & Nybakk, 2009). Jenssen & Nybakk (2009) found that participation in conferences and courses has a positive effect on process and market innovation.

2. Internal Knowledge: Sharing knowledge could be defined as the culture of social interaction, including the exchange of employee knowledge, experience, and skills across the entire department or an organization. Moreover, employees can develop new skills through cross-functional integration and share the right knowledge that is necessary for developing the products (Lin, 2007; Calantone, Cavusgil, Zhao, 2002).

According to Svetina & Prodan (2008), found that the usage of internal resources of knowledge has a positive influence on the firms' innovation performance. These internal sources of knowledge include in-house R&D activities and learning from continuous improvements in processes. Moreover, employee skills form an important source of new knowledge. Hence, in order to improve the base of internal knowledge, firms tend to organize internal education and training programs within their borders.

Moreover, external and internal knowledge could be acquired and generated from R&D or non-R&D activities:

1. R&D: In manufacturing sectors that are characterized by high technology, R&D is a major element for innovation activities. The commercialization of R&D output is the pivot of the continuous innovation in the economy. Hence, innovation occurs when information is not only being accumulated or stored but to be created (OECD & Eurostat, 2005; Okpara, 2007; UNECE , 2012).

According to OECD & Eurostat (2005), the third edition of the Oslo manual defined R&D as:

> "Research and experimental development (R&D) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (as defined in the Frascati Manual)."

Rammer, Czarnitzki & Spielkamp (2008) stated that R&D activities produce new knowledge that is essential for innovations, which could lead to producing superior product characteristics or a significant increase in the production efficiency. However, these R&D activities are costly and risky because it requires minimum resources and time to achieve the results

Zemplinerová & Hromádková (2012) argued that expenditure on R&D is expected to increase firms' productivity by reducing the cost existing goods (process innovation) or extend the choice of product innovation. In addition, R&D is an innovation input that has an indirect effect on the innovation output, but not all R&D investments lead to successful innovations. Thus, firms that undertake R&D, may be more prone to use patents, trademarks, or designs to prevent imitation.

As stated by Huang, Arundel & Hollanders (2010), the lack of technological information for solving problems would increase the risk of an innovation project, and consequently will push the firm to obtain necessary information. Moreover, the authors found that product innovative firms are more likely to engage in R&D activities rather than non-product innovative firms.

R&D is the primary component that determines the innovation potential. Hence, sectors that are more dynamic are much more dependent on R&D because they need to follow the evolution of the world, so they have a great need for appropriate R&D activities but non-R&D activities inside the firm can be an initiative step for the creation of R&D capabilities.

These R&D activities within the firms can develop a new product or process (UNECE, 2012; Molero & García, 2008; OECD & Eurostat, 2005).

Toner (2011) stated that "Research and Development (R&D) is a part of innovation activity." R&D departments or activities within firms or organizations are the major sources of internal knowledge. In research and development, focusing on knowledge includes both knowledge creation and reuse of existing knowledge. Nevertheless, in the developing countries, which are dominated by small or medium-sized firms dominate, they suffer from limited technological capacity and neglect the R&D in their firms (Matthews, 2003; Sakala & Kolster, 2014).

In relation to Huang, Arundel & Hollanders (2010), the authors argued that R&D is the central role of technological innovations and essential for the competitiveness of medium and fast growing industries because it is the source of many innovations. Also, the use of R&D at the national level can produce advanced products for export, and that can improve the national trade. Thus, R&D must lead to innovations (product and process innovations) and the diffusion of technology in order to create economic benefits. Most R&D activities are related to product and process innovations, and some could be related to marketing or organizational innovations (OECD & Eurostat, 2005).

Molero & García (2008) found that the combined effect of R&D expenditures and patent have a positive effect on product innovation in the dynamic international sectors.

2. Non-R&D activities: Despite the fact that R&D has been the focus of policy makers in the field of innovation, Non-R&D innovation is a usual economic phenomenon. Although, not all innovations are technological and R&D-based others are based on non-technological forms that would contribute to the economic success of the firms (Huang, Arundel & Hollanders, 2010; Kirner, Kinkel & Jaeger, 2009).

According to OECD & Eurostat (2005), non-R&D innovative activities include:

1. The identification of new concepts for processes, products, marketing methods or organizational changes.
2. Buying technical information, paying fees or royalties for patented inventions.
3. Acquiring and developing human skills through internal training or by hiring.

4. Investing in equipment, software, or intermediate inputs, which could be included in the innovative work.

R&D activities are very risky, involve high uncertainty, and require large resources, which makes the enterprise threatened to fail. Thus, small firms tend to substitute R&D activities by managing innovation practices, which are less risky and require less investment. These non-R&D activities)include the team working, the management of human resource / human capital, cooperation with external partners and obtaining external knowledge from the environment such as client competitors and suppliers as discussed previously (Rammer, Czarnitzki & Spielkamp, 2008).

According to Huang, Arundel & Hollanders (2010), non-R&D firms can conduct creative and in-house activities such as work design or production engineering. Otherwise, these firms can be technology adopters and innovate through purchasing advanced machinery, computer hardware, software, or licenses from other firms or organizations. They assumed that non-R&D firms tend to spend part of their budget on innovation activities that do not require R&D. In particular, non-R&D projects are less financially risky than R&D based innovations. Also, innovative projects could be less risky projects when firms can obtain information about existing technologies that were developed by other firms.

However, non-R&D activities are implemented through the following:

1. Employee knowledge (Human Resources): Human capital or resources represent the knowledge and skills possessed by individuals, and firms acquire human capital by hiring skilled employees. Human resources can generate ideas, which help to gain a competitive advantage and to distinguish any organization from its competitors for a period. Companies must recruit suitable employees who have the ability to integrate new employees into the organization, and ultimately determine the success of the company. On that account, educated and experienced staff is essential for innovation at a high level in order to generate new knowledge and develop existing knowledge (Rose et al., 2009; Urbancová, 2013; Huang, Arundel & Hollanders, 2010; Deloitte, 2005)

Moreover, firms that help employees to contribute to knowledge in groups and organizations is prone to create and generate new ideas and develop new business opportunities, thereby encouraging, and facilitating innovation. Also, human resources available for R&D are important to innovation due to the presence of highly educated and qualified personnel (Darroch and McNaughton, 2002, as cited in Lin, 2007; UNECE , 2012).

Lin (2007) claimed that employee's desire to donate and gather knowledge with workmates is likely to keep alive innovativeness, and knowledge sharing does some things better, faster, and more efficiently. Moreover, the author found that employee willingness to collect and donate knowledge allows firms to improve their innovation capability.

Nevertheless, staff should be equipped with the right types of knowledge, skills through training their personnel (Kalyani, 2011; UNECE , 2012).

2. Skilled Labor & Training (Internal & External Knowledge): Advanced nations are different from other nations in terms of skilled labor formation system. These differences are major features that determine innovation and economic performance in any nation. Skilled labor is an absorptive source of knowledge by interacting inside and outside the firm, and that could contribute to the development of radical new ideas for process innovations. To allow employees to innovate, they need to have expertise, knowledge and necessary technical skills. Thus, there must be a wide range of skilled labor and professions that involve in the implementation of innovations, which cover a very wide range of professions. Therefore, firms should provide training for their employees to develop their knowledge and skills (Toner, 2011; Bogers, 2009; Parzefall, Seeck & leppänen, 2008; Rose et al., 2009). Nevertheless, Toner (2011) argued that skilled labor is vital but not a sufficient condition for successful innovation. However, the type of work organization adopted by the firm has a major influence on the workers' participation in various forms to improve the workplace.

According to Sakala & Kolster (2014), in North African countries, the lack of human resource qualifications and the inefficacy of the human resource allocation form the serious problem of innovation. This was supported by Toner (2011), which found that achieving high academic standards within a country creates skilled, educated, and trained labor which becomes eligible to be engaged in innovation activities.

Due to the large differences in innovation across industries and firms, there are differences in qualifications, occupational structure, and the level of education in the workforce. Internal Training of staff within the organizations is a vital element for learning and ideas generation (Toner, 2011; Urbancová, 2013).

Toner (2011) and Bogers (2009) argued that learning by doing is the main driving force for process and incremental innovation. And Sakala & Kolster (2014) found that the impact of vocational education on innovation is significant, reflecting the importance of training to

build the capacity of the company to absorb new know-how knowledge that is vital to maintaining innovations.

Learning by doing is based on the application of practical knowledge and it is the result of the accumulation of knowledge and expertise generated in the production process or use of goods and services. More experienced, skilled and educated workers have higher levels of labor force participation and therefore have more opportunities to contribute to innovation. Thus, improving the quality of human capital skills in the areas of education, training, experience and improving the quality of ICT and capital goods are the basis of complementarity between capital and labor. As a result, in the long-term the capital-labor ratio would increase (Toner, 2011).

Molero & García (2008) found that access human capital could be positive for product innovation and negative for process innovation. However, Sakala & Kolster (2014) found that employee's qualifications appeared to be non-significant to innovation due to the failure in optimizing human capital in innovating activities.

2.6.5 Environment & Culture

Creative ideas are not sufficient for business survival; innovative organization and culture are required to maximize creative assets (Okpara, 2007).

Bogers (2009) argued that a proper environment that is conducive towards experimentation and creative behavior allow the production floor workers to contribute to innovations. Therefore, creating an innovative culture is the key driver of the firm's competitive advantage, survival, and growth. An organizational culture, which promotes innovation, contributes to the wide recognition for innovation. Creating a culture of knowledge sharing facilitates the flow and generation of new knowledge. Moreover, high level of trust and low fear in corporate or organizational culture can continue the implementation of innovation within the organization (Kalyani, 2011; Parzefall, Seeck & leppänen, 2008; Matthews, 2003; Chao et al., 2010).

Here are the most important aspects of innovative environment:

- Innovative Culture**:** innovation is not the only thing that firms can purchase or install, it is also a culture that must be accepted. When firms perform in a culture that recognizes values

and promotes innovation, they will have a greater capacity to innovate. Therefore, firms should focus on innovation around three main elements of corporate culture: core values, beliefs, and norms (Kalyani, 2011; Hury & Hult, 1998; Lin, 2007; Deloitte, 2005).

Based on the above pillars, institutionalizing innovation is necessary by creating the appropriate culture, structure, incentives, systems, and processes that promote innovation activities. Therefore, firms must institutionalize their innovation process to maintain their competitive advantage by creating an innovative environment where creative thinking is central to their values, assumptions, and actions. Moreover, organizations or firms that encourage innovation with available resources tend to implement innovations and develop competitive advantage (Yeh-Yun Lin & Yi-Ching Chen, 2007; Deloitte, 2005; Kalyani, 2011; Hurley & Hult, 1998; Parzefall, Seeck & leppänen, 2008).

Glasberg & Ouerghemi (2011) argued that organizational culture is the desire for innovation and the consequences of employee behavior. Moreover, Toner (2011) found that practices of organizations are strongly influenced by their workforce engagement in innovation activities.

In any organization, the culture plays a vital role in promoting innovation based on the following elements:

- Team**:** The team will be in the highest level of innovative behavior when members need each other to accomplish certain tasks. It is necessary to establish a partnership between the employees and the owner-manager to develop a team that can achieve positive results (Parzefall, Seeck & leppänen, 2008; Mazzarol, 2002). Mazzarol (2002) found that the strength of the owner manager's leadership and role modeling; would influence the ability of employees to promote innovation, which is found to be difficult.

- Individuals**:** individuals within the firm are the main drivers of innovation & creativity, and innovative organizational culture, which needs creative staff (Glasberg & Ouerghemi, 2011).

  To be innovative, a firm requires employees who look for new opportunities, take risks, and cooperate with others, are committed to their organization and need leaders who can create an environment that guide and promote innovative behavior (Deloitte, 2005).

  Employees should consider that change is a routine, and firms must create management teams that are concerned with the change process. Organizational innovation encourages employees to think independently, creatively and apply their personal knowledge to

organizational problems. Also, organizational culture gives employees various incentives to accomplish desired goals (Deloitte, 2005; Kalyani, 2011; Glasberg & Ouerghemi, 2011).

Firms can empower employees by empowering them through granting them the authority to make appropriate decisions and assign ownership of activities. Moreover, employees tend to be more motivated to donate and exchange knowledge with colleagues, when they feel pleasure in sharing knowledge and helping others. Therefore, innovative people within the organization can help to create and foster an innovative culture. Hence, individuals must be able, satisfied, willing, and motivated to innovate in order to engage in innovative work (Deloitte, 2005; Lin, 2007; Kalyani, 2011; Parzefall, Seeck & leppänen, 2008).

- Learning culture: Developing a culture of learning "learning culture" is one of the key elements of the innovation culture, and then actively promotes the continuous training and development of the staff. This can be done through knowledge creation to encourage learning networks, teamwork, and leadership (Kalyani, 2011; Matthews, 2003).

- Learning orientation: To gain a competitive advantage, organizations require a strong learning orientation. Learning orientation is the activity of creation and usage of knowledge in order to improve the firm's competitive advantage; it includes collecting and sharing information about the needs of customers. Moreover, it includes changes in the market and competitors actions, as well as development of new technologies to create new products, which are superior to the competition (Nybakk, 2012; Calantone, Cavusgil & Zhao, 2002). Nybakk (2012) argued that learning orientation and innovation are closely associated, which learning is a base and prerequisite for innovation, depending on learning increases the innovation capacity, which affects the firm's overall performance. The importance of learning orientation is that it contributes to the creation of resources and skills required for the firm (Calantone, Cavusgil, Zhao, 2002).

  Firms with Learning-oriented culture facilitate innovation and could survive longer than firms that do not emphasize learning orientation in their culture. Learning orientation is associated with learning capability of the firm and with its system structure and culture, and there is a strong relationship between learning orientation and innovativeness on operational performance. (Eris, Neczan & Ozmen, 2012; Hurley & Hult, 1998; Calantone, Cavusgil & Zhao, 2002; Nybakk, 2012).

  Nybakk (2012) found that learning orientation has a positive impact on firm innovativeness and financial performance. In addition to that, Eris, Neczan & Ozmen (2012) found that

learning orientation has an impact on the firm's innovativeness, and learning orientation mediates the relationship between market orientation and innovation.

- **Market Orientation:** According to Hurley & Hult (1998), market orientation provides the firm with a source of ideas that are necessary for improvement and change. Moreover, information that obtained from the market allows firms to create new information and innovations besides learning something new or to adopting innovations. To allow firms to be market-oriented, they must have a learning capability as discussed previously (Nybakk, 2012; Eris, Neczan & Ozmen, 2012).

  Eris, Neczan & Ozmen (2012) found that market orientation has an influence on performance through learning orientation and innovation, and market orientation has an impact on learning orientation.

- **Managers:** The manager's leadership is an important feature that is necessary for organizational development. However, to turn creative ideas into commercial innovations, firms must support managers because they are critical for employee innovativeness. To support organizational culture, the role of top management is more important in the facilitation of the social interaction culture than extrinsically motivated employees who promote knowledge and share activities within the firm (Chao et al., 2010; Lin, 2007; Parzefall, Seeck & leppänen, 2008).

  Chao et al. (2010) found that transformation leadership and transactional leadership positively affects the innovative behavior of the employee; a higher degree of supervisor leadership guide to a higher level of employee innovative behavior.

- **Reward & Motivation**: to promote innovation culture, companies need to motivate their employees with rewards, recognition, and empowerment. The system of rewarding should be aimed at promoting innovation. However, every employee has different needs and desires, which make each employee respond differently to different incentives and rewards (Kalyani, 2011; Deloitte, 2005; Glasberg & Ouerghemi, 2011).

  Bogers (2009) concluded that rewards are an important element for process innovations through learning-by-doing, which stimulates the production floor workers. Therefore, providing a kind of different rewards, and incentives for employees, motivate them to be more receptive to creativity and creative ideas. In addition to financial reward, firms have to reward their employees with both financial and intrinsic (non-financial) incentives that are

linked to the achievement of agreed targets. Hence, firms must establish a system that offers different rewards according to the desires of their employees (Glasberg & Ouerghemi, 2011; Deloitte, 2005).

In addition, an innovative culture should inform their employees that the failure of new ideas or initiatives to fulfill all the expectations would not affect their position in the company because the staff will be afraid of innovation if they feel that they will be subjected to a significant risk (Deloitte, 2005).

2.7 Barriers to Innovate

According to UNECE (2012), the major obstacles to innovation in emerging markets are the violation of property rights including intellectual property rights, patents registration procedures, heavy bureaucracy, corruption and the lack of judicial independence.

Moreover, the other obstacles to innovation in the emerging markets that are mentioned by UNECE (2012) are:

- The lack of communication and cooperation between the scientific communities and firms on one hand, and the lack of individual investments in R&D, on the other hand, are the main obstacles for emerging economies to commercialize their R&D results.
- The lack of qualified and skilled human resources, especially the higher educated, are the basis for innovation and commercialization of its results.
- Emerging markets are characterized by the insufficient development of telecommunications and information technologies.
- The emerging market economies are late from the developed countries regarding the commercialization of R&D outputs and innovation-based initiatives and the deficiency of private investments in R&D and science.
- The lag in the efficiency of converting and transforming the innovation input into an innovation outputs that can be commercialized.
- One reason that deters the incentives of entrepreneurship and invention is the general business environment like an enterprises administration burden, violations of property rights and corruption.

In addition to that, PalTrade (2014) mentioned that Palestinian labs are not qualified to carry out tests on certain products, which means product samples have to be sent to labs in Israel, Jordan, and other countries. Thus, the transportation of the samples increases the time required and cost to export. Moreover, Palestinian exporters have very limited access to information about the ports, airports, set import /export procedures, documentation requirements, etc.; this increased the dependence on Israeli forwarders and customs agents.

2.8 The Firm's Size, Age & Innovation

The main difference between large and small firms is that large firms own more internally generated funds, which allow these firms to invest in risk R&D projects and allow them to benefit from the economies of scale in R&D activities. Moreover, these small firms suffer from the lack of internal sources of funding, and they may face obstacles in raising capital from external sources due to lack of collateral and records of past successful projects of R&D. This deters firms from creating a portfolio of several R&D projects to insure themselves against the risk of failure (Huang, Arundel & Hollanders, 2010; Kirner, Kinkel & Jaeger, 2009).

Jenssen & Nybakk (2009) argued that small firms often have a weak position in the market than large firms, and that could affect innovations.

Zemplinerová & Hromádková (2012) found that the firm's decision to innovate increases with its size; larger firms tend to invest more to develop innovations because they have more financial resources for their R&D and more able to diversify risk. However, they found that the firm size has a negative influence on the innovation output. Because bigger firms are less efficient in transforming the innovation input into output.

Molero & García (2008) found that in sectors that are adapted to the international evolution, the influence of the firm size on process innovation is much more positive in these sectors. This was supported from Yeh-Yun Lin & Yi-Ching Chen (2007), which found that larger firms with investments abroad have more sales than smaller ones. According to the specific effect of the firm size of types of innovation, Molero & García (2008) found that the significant factors are very similar for process and product innovation, although the size and the firm's integration are more important in product innovation.

Pianta & Vaona (2006) argued that the firm's size is associated with certain types of innovative efforts to introduce new products or new processes, and found that product innovations are positively associated with firms aiming to open new markets or increase their market share.

Calantone, Cavusgil & Zhao (2002) used the size of the firm as a control variable, which found that older firms have strong relationships between learning and firm innovativeness, whereas younger firms have weak relationships.

According to Urbancová (2013), the author found that a small organization innovates without taking targeted measures and without a sufficient number of qualified employees. In turn, this leads to the failure of their innovations. Conversely, larger organizations tend to use their resources, whether they are financial or technological nature or consider the use of experts and professional management.

Concerning the age, Nybakk (2012) found that older firms are more likely than younger ones to employ knowledge and to turn it into innovation activities. Calantone, Cavusgil, Zhao (2002) found that the effect of learning orientation on firm innovativeness depends on the length of time in business because older firms are more likely to use the knowledge gained and turn it into innovation.

From the previous discussion, it is obvious to conclude that firms with bigger size involve more in innovations, and older firms tend to be more innovative than smaller ones. However, there are studies that found a negative relationship between the firm's size and innovation. That makes the relationship ambiguous and need further investigation. This study will investigate the role of size and age in performing innovations in the Palestinian firms.

2.9 Performance and Outcomes of Innovation

This section discusses the main performance indicators and outcomes of innovation.

2.9.1 Performance

Most studies agreed upon that innovation has an impact on the firm's performance. However, the performance is still debatable and controversial from one firm to another (Kemp et al.,

2003; Cameron 1998; Grabowski et al., 2013; Hassan et al. 2013; Yeh-Yun Lin & Yi-Ching Chen, 2007; Rosli & Sidek, 2013; Lages, Silva & Styles, 2009; Urbancová, 2013).

An evidence about the impact of innovation on the firm performance was conducted by Grabowski et al. (2013), which found that innovation had a positive impact on the firms' performance in Turkey. Moreover, this had been supported from Hassan et al. (2013), which found that increasing the innovativeness in manufacturing firms would lead to a higher performance because better product quality brings more customer satisfaction and product innovation leads to innovative performance. In addition, Cameron (1998) indicated that innovation contributes significantly to the growth and has a significant impact on the performance of the firm, industry, and the country. Moreover, Rosli & Sidek (2013) found that product and process innovations have positively and significantly influenced the performance of the firms where product innovations have a superior impact on the performance compared to process innovations. Thus, product innovations have more impact on the performance than process innovations. According to Kemp et al., (2003) the author tried to depict the relationship between innovation and performance in general, and for SMEs in particular. He found that innovation has a significant effect on firm performance.

However, the performance could be divided into two types: economic and organizational performance.

Relating to the impact of innovation on the firm' economic performance, Urbancová (2013) indicated that innovation is a critical element for achieving economic performance where it determines the economic success of the firm. Lages, Silva & Styles (2009) found a positive relationship between economic performance and product innovation. According to product innovation, the authors found a significant and positive influence on the economic performance. In addition, implementing innovations could achieve organizational performance, and all innovation types have a direct link with innovative performance (Yeh-Yun Lin & Yi-Ching Chen, 2007; Hassan et al., 2013).

In conclusion, all innovation types have a positive impact on the firm's performance and growth. According to product and process innovations, both types appeared to have a positive impact on the firm's performance with a greater outcome from process innovation.

2.9.2 Exports

To initiate exporting, firms have to acquire new markets, where even in short or long time span, could results in maximizing their profits. Therefore, it is easier for exporting firm to innovate because they can benefit from knowledge inputs that are not available for domestic firms (Karasek, 2012; Bocquet & Musso, 2011).

Roper & Love (2001) showed that product innovation has a positive effect on export. Moreover, the empirical results of Karasek (2012) showed that 43.86% of the studied enterprises agreed upon that low innovation in their products are a significant factor for the exports development in their firms, and 55.29 % of the companies declared that low innovation level was a critical factor for abstaining the firm from export activities. However, only a few number of firms admitted that product innovation is the most important and vital activity taken to improve the competitiveness of their exports.

However, the positive impact of innovation on export was supported by other studies, which found that innovation has a positive and highly significant indicator of export intensity. Moreover, it was found that exporting firms are more innovative than non-exporting, and exporting firms invest more in R&D than non-exporters (REÇICA, 2010; Bocquet & Musso, 2011).

In Palestine, Khatib et al. (2013) confirmed that innovation has a clear and superior impact on the growth of exports compared with non-innovative firms.

According to the impact of product and process innovations, Roper & Love (2001) and Bocquet & Musso, (2011) found that product innovation has a more significant impact on export than process innovation. Roper & Love (2001) examined the impact product innovations of export in UK and Germany, and they found that product innovation has a positive effect on the probability of exporting. Moreover, Bocquet & Musso (2011) argued that product innovation has a significant and positive impact on the export decision while there is no such evidence for process innovations, where product innovation is a major factor that affects the decision of firms to start exporting. However, they found that innovation allows plants to enter export markets but not to expand their export sales.

With reference to the situation of innovation and export in developing economies, REÇICA (2010) found that firms with export intentions in less advanced economies are more oriented to product innovation than firms in more developed countries. That could be attributed to the

fact that firms in more developed countries are more stable in developing their products and more concentrated on targeting domestic markets. Therefore, that means that there is a potential for developing countries to increase their exports or start exporting by adopting innovations.

Here from the previous studies, it is clear that both product & process innovations have an impact on the exports to foreign market. Moreover, most studies found that product innovation has a greater impact on firm's export or the probability to export than process innovations.

2.9.3 Employment

Innovation is a vital element for firms' growth and the reduction of the unemployment rate (Pianta, 2005; Meriküll, 2008; Zimmermann, 2008).

Pianta (2005) argued that if innovation does not occur, economic activities, facing competitive pressure would reduce costs, wages, and ultimately jobs. Meriküll (2008) supported this when he found that a higher proportion of firms with innovative products associated with a higher rate of job creation and growth in net employment. Moreover, Zimmermann (2008) found that there is a positive relationship between innovation and employment growth in all SMEs included in his study (SME with different growth rates). However, Meriküll (2008) found that there is a lag between innovation and its impact on employment. This could be attributed to the fact that innovations usually take effect one year after the innovation period.

According to which type of innovation has a significant impact on the employment, most studies argued that product innovation has a positive impact on employment, but the impact of process innovation is stronger than product innovation. In addition, which type of innovation has a stronger influence is still ambiguous (Zimmermann, 2008).

Pianta (2005) argued that it is important to distinguish between product innovation, which leads to a positive effect on the whole employment, and process innovation. However, Meriküll (2008) found that both products and processes innovations have a positive impact on employment where process innovation tend to have a stronger positive effect on employment than product innovation. In addition, Zimmermann (2008) explained the difference of the impact of process and product innovation on employment; he found that

the lower influence of product innovation on employment could be explained because product innovations may take time to accrue. In contrast, process innovations allow immediate price reductions, which could bring earlier measurable impacts on employment (Zimmermann, 2008). According to the situation in Palestine, Khatib et al. (2013) found that Palestinian enterprises that involved in both process and product innovation recorded the highest increase in employment and firms that only introduced product innovation had a lower increase in employment.

Hence, it not obvious whether product or process innovation has a more and stronger impact on employment. However, most of the studies agreed upon that both types (product and process innovations) have a positive effect on employment.

2.9.4 Competitive Advantage

The majority of the studies agreed that the main aim of innovation is to achieve competitive advantage (Urbancová, 2013;Hassan et al., 2013; Khatib et al., 2013 ; Kirner, Kinkel & Jaeger, 2009; Lages, Silva & Styles, 2009; Jenssen & Nybakk, 2009; Rose et al., 2009; Lin, 2007;Mazzarol, 2002; De Jong & Vermeulen, 2004).

Innovation is the key and major element that leads to competitiveness and economic growth. Moreover, the outcomes of innovation could have a positive impact on the economic growth, welfare, and long-term competitiveness in the international markets. (Khatib et al., 2013)

Kirner, Kinkel & Jaeger (2009) argued that all types of innovation could lead to competitive advantage. Moreover, developing new products are necessary for firms to gain competitive advantage (De Jong & Vermeulen, 2004).

The development of competitive advantages is a positive factor for enterprises. Hence, to sustain competitive advantage and increase the firm profitability, managers should appreciate investments that bring innovation capability to the firm where competitive advantage (achieved as differentiation, cost leadership & focus strategies) in turn positively relates to the firm performance (Mazzarol, 2002; Hassan et al. , 2013).

2.10 Theoretical & Conceptual Framework

This section focuses on the variables that are related to product and process innovations in the Palestinian plastic industry. The relationships between the variables are formulated to show the forward and backward linkages between the variables. Also, the relationships will take into account innovation performance, drivers and the outcomes of innovation.

The dependent and mediating variables in this research are product innovation, process innovation, marketing innovation and organizational innovation. Therefore, the concentration in this research will focus mainly on the technological innovation (product & process innovation). This study focuses on the product and process innovations because the Palestinian enterprises are small in general, and the firms in the same industry produce almost identical products. These dependent variables also work as mediating variables between the determinants of innovation (the dependent variables) and the impacts (outcomes) of innovation on certain products in the Palestinian plastic industry, and they include: Plastic Bags, Plastic Boxes, Sanitary ware & pipes, housewares, medical tools, foam & mattresses, furniture, construction & building equipment, toys, recycled plastics, and disposables. The operational definitions of the variables were built based on existing definitions from the third edition of the Oslo Manual for Innovation and previous studies. In addition, those variables are measured when the operational definitions are used to explain the meaning and the dimensions of each variable. These indicators will be considered in this study when firms' managers and/or owners will be asked through the questionnaire and the interviews on those products lines to evaluate the performance of innovation in their firms.

Firms start innovation when they are involved in one or more activities, which could be R&D or non-R&D based activities. Therefore, firms can innovate through creativity, making use of new knowledge from external sources, generate and share their knowledge, establishing linkages with external sources, build up internal linkages, financing or through creating an innovative environment or culture. On the other hand, data on the characteristics and traits of each firm will be gathered to explore if there are differences between innovator and non-innovator firms in terms of these characteristics such as the size and the age.

In this research, R&D and non-R&D activities are taken into account to analyze the determinants and impacts of innovations.

2.10.1 The dependent and mediating variables: Types of innovation.

There are two major forms of innovation: technological and non-technological innovations.

Technological innovations include product and process innovations since those two types are related to the knowledge and technology. On the other hand, non-technological innovations include marketing and organizational innovations (OECD & Eurostat, 2005; OECD, 2009).

Each type of innovation is discussed below plus the measures of each type of innovation.

1. Product innovation:

Based on the literature discussed, product innovation is defined as the introduction of new product or significantly improving an existing product in terms of shape and physical characteristics (OECD, 2009). Thus, performing product innovations could be done through producing or introducing new products. These new products could be produced according to the market needs, or they could be new to the firm, new to the industry (plastic industry) or new to the market. The firm also can perform product innovations through improving or changing the shape or physical characteristics of its existing products. Thus, the following questions could be asked about the indicators of product innovation:

1. Does the firm develop its existing products or produce new ones?
2. Does the firm produce new products according to the market needs?
3. Does the firm continuously adjust the design, alter the shape, or change the physical characteristics of its existing products?

2. Process Innovation:

Concerning process innovations, it is the procedure of improving the existing production methods (processes) or implementing a new production method that is new to the firm or the industry. Thus, firms can perform process innovations through developing and improving their existing production methods or coming up with new process. Moreover, process innovations are highly associated with reducing the production cost. Thus, firms can perform process innovations through acquiring new machinery or advanced technology that operate and produce with more efficiency & lower cost. Consequently, the main result of process innovation is to reduce the production cost and to enhance the efficiency. Hence, in order to perform process innovations, there are indicators that related to how firms change their traditional production processes that must be changed with advanced methods or upgrading machinery and equipment (OECD, 2009; Jenssen & Nybakk, 2009; Rosi & Sidek, 2013; Nybakk, 2012).

Thus, the following questions could be asked about the indicators of process innovation:

1. Does the firm develop its production methods and/or processes?
2. Does the firm improve its production methods and/or processes?
3. Does the firm change the raw materials or the intermediate products used in the production process?
4. Does the firm use sophisticated and advanced technology in the production process?

3. Non-technological innovations (Marketing & Organizational Innovations):

Regarding the non-technological innovation (marketing and organizational innovations), in this research, marketing innovation is defined as the procedure of carrying out new marketing methods such as changing the product design, packaging, placement, promotion or pricing. On the other hand, organizational innovation includes several procedures to perform a new method in organizing and managing the firm or the business. This could be done through changing the organizational workplace (OECD & Eurostat, 2005; OECD, 2009).

Thus, the following questions could be asked to determine if there are non-technological innovations in the firm:

1. Does the firm use new marketing methods?
2. Does the firm use new organizational or management methods?

2.10.2 The independent variables (variables that influence innovation)

From the literature, it was concluded that creativity, internal & external knowledge, internal & external linkages, obstacles, and the firm's innovative environment could influence innovation.

1. Creativity

Starting with creativity, it is expected that creativity could influence any type of innovation because it is related to the entrepreneurial activity inside the firm (entrapreneurship). Firms can be creative through the introduction of novel ideas that could be transformed into innovations. Those new ideas could lead to the introduction of new products that other firms in the same market or industry did not produce or develop. Moreover, those ideas could be

related to changing or improving the shape or characteristics of existing products, or improving an existing production method (Kirzner, 2009; Lukic', 2012).

Therefore, it is hypothesized that creativity has a significant positive influence on innovation, and the following questions could be asked about the indicators of creativity:

1. Does the firm employ new ideas that could lead to producing new products, which others didn't produce
2. Does the firm employ new ideas that are related to developing the products' shape?
3. Does the firm employ ideas that are related to production processes?
4. Does the firm employ new ideas that could reduce the production costs?
5. Does the firm stimulate its staff toward developing the firm's products?
6. Does the firm steer its employees toward developing new production methods?

2. Internal Knowledge

It is expected that internal knowledge will positively affect all types of innovation, because the operational definition of the internal knowledge is defined as the process of creating and sharing knowledge inside the firm between the personnel through the internal training and/or the interaction, and the exchange of knowledge or experience/skills across the firm's divisions and departments. Firms share their own produced knowledge, which it is the creative work that leads to an increase in the stock of knowledge that could be used to create new things or improve existing products or processes (OECD, 2009; OECD & Eurostat, 2005).

Internal knowledge could be acquired through testing or developing existing products or production processes. Testing products and processes enrich the firm with the new practical knowledge that helps the personnel to avoid costly mistakes and leads to the development. Also, firms can share knowledge inside their boundaries through training their staff inside the firms. Training the staff develops their knowledge base and skills, which in turn allow them to generate new ideas. In addition to the internal training, internal knowledge could be enhanced through developing the personnel skills through learning by doing. Learning by doing is the practical application inside the firm that helps the personnel to acquire and accumulate practical knowledge and expertise, which could contribute to innovations. Moreover, internal knowledge could be produced through performing R&D activities, which include development, testing and further research in order to modify the characteristics, shape, design or the technical function of certain product or process (Rose et al., 2009;

Urbancová, 2013; Sakala & Kostler, 2014; Toner, 2011; Bogers, 2009; Toner, 2011).

Thus, the following questions could be asked about the indicators of the internal knowledge:

1. Does the firm perform research and development (R&D)?
2. Does the firm conduct development and testing on its products?
3. Does the firm develop and test its production methods or processes?
4. Is the firm interested in training its staff?
5. Is the firm interested in enhancing its staff skills?
6. Does the firm use sophisticated machinery and software?
7. Does the firm use advanced inputs in the production processes?
8. Is the firm interested in exchanging information and experience among staff or between its departments?

3. External Knowledge

Concerning the external knowledge, firms can acquire external knowledge that is necessary for innovation through using or buying new R&D and advanced machinery or sophisticated inputs. In addition, this can be done through buying technological property rights such as licenses and certificates that allow the firm to produce new products or to adopt new production methods. This, in turn, allows the firm to differentiate its products in terms of design, characteristics, quality, and price. In addition, external knowledge could be acquired directly or indirectly from its external environment such as customers, suppliers, and wholesalers in order to satisfy their needs, improve a certain product or to take a feedback about the products and the competing products in the market. The external environment contains rich information about the market needs and competitor's strength and weakness.

The most important source of external knowledge is the knowledge acquired from the results of the scientific researches, publications, and professional reports. Nevertheless, firms can buy technical information in order to develop and/or improve their production processes and products or create new ones. Another indicator of external knowledge is the knowledge gained from the participation in external courses, conferences, workshops, and seminars. It is expected that this kind of knowledge is essential to perform innovations in the firm because it equips the participants with new ideas that could be transformed into innovations. Moreover, training the personnel outside the firm or the country provides them with new knowledge & improves their technical and practical skills that contribute to innovations. Therefore, it is expected that external knowledge contributes positively to innovation.

Moreover, the following questions could be asked about the indicators of the external knowledge:

1. Does the firm get information from its customers to meet their needs?
2. Does the firm get information from customers in order to improve its products?
3. Does the firm take feedback from its customers?
4. Is the firm concerned about making use of external research results?
5. Is the firm interested in purchasing and acquiring technical information in order to develop new products?
6. Is the firm interested in purchasing and acquiring technical information in order to develop the production processes?
7. Does the firm train its staff abroad?
8. Does the firm send its employees to various local and abroad seminars, workshops, and conferences?

4. External Linkages

External linkages are all the external ties, networks, and relationships with different parties outside the firm boundaries. These linkages are necessary because they form an indirect channel for the inflow of necessary knowledge into the firm, which could contribute to innovation. In this study, it is expected that external linkages positively affect all types of innovation. These external linkages could be established through the cooperation with other firms, universities, scientific & R&D institutions. This kind of cooperation could lead to new or improved products and processes because these cooperation's increase the firm's technical and scientific knowledge base.

In addition, firms also can enhance their external ties and networks through the membership in commercial & scientific organizations, chambers of commerce, or industrial unions. This kind of linkages opens the door for new external knowledge and ideas that inflow into the firm through its participants. Moreover, the participation in foreign exhibitions and seminars enhances these external ties that in turn help the firm to absorb new product ideas or new production processes that could lead to innovations. Finally, external linkages could be established through building networks and cooperation with competitors, customers, and suppliers. This would contribute to increasing the knowledge sharing that leads to innovations. Therefore, external linkages contributes positively to innovation, and the following questions could be asked about the indicators of the external linkages:

1. Does the firm collaborate with other companies, universities, or scientific research institutions to develop its production processes?
2. Is the firm concerned about the membership in commercial and scientific organizations, chambers of commerce or industrial associations?
3. Does the firm participate in foreign exhibitions and seminars?
4. Does the firm build networks and external relationships with its competitors?
5. Does the firm establish relationships with its customers and suppliers?

5. Internal Linkages

According to the internal linkages, they are all the ties, relationships, and networks inside the firm boundaries, which are established between the firm's departments or between the personnel and managers. Establishing internal ties inside the firm could be done through the commitment and partnership between the labor and their managers. This kind or partnership encourages the cooperation that could lead to the generation of new ideas (Mazzarol, 2002). Therefore, in this study, it is anticipated that this type of linkages could contribute to performing innovations inside the firm.

The following questions could be asked about the indicators of the internal linkages:

1. Does the firm make partnerships and communication networks between its managers and the staff?
2. Do the firm's managers have good relations with the staff?
3. Do managers discuss and take into consideration feedback, useful ideas from the board and staff members?

6. The firm's environment & culture

It is the environment that promotes and fosters innovation in its culture. In the Palestinian business environment, the following indicators are employed to assess the influence of innovative environment. First of all, creating this kind of environment could be achieved through creating a motivation and rewarding system, which could contribute to innovation and especially process innovations. In addition, an innovative environment must contain a trust and flexible system that deals with failure and encourage the personnel to transform their ideas into economic value or innovations, without any fear of failure. Furthermore, firms can create new products and processes or develop their existing ones through allowing the personnel to discover new opportunities, take risk, and think dependently. Moreover, it

is necessary for firms to create a learning culture that promotes the continuous learning, training and development of the personnel through enhancing the firm learning orientation. Finally, the innovative environment could be created through orienting the firm's personnel into the market through creating a market orientation culture, which supplies the staff with new ideas that could lead to some improvements and positive changes inside the firm. These indicators will be asked to the firms' managers in order explore their assessment toward the innovative environment or culture in their firms. Thus, in this research, it is assumed that innovative environment could positively affect innovation, and following questions could be asked about the indicators of the firm's innovative environment or culture:

1. Does the firm reward its creative employees?
2. Does the firm punish its low productivity employees?
3. Does the firm encourage its employees toward developing new or improved products?
4. Does the firm encourage its employees toward developing new products or production methods?
5. Does the firm encourage its employees to learn and develop their skills?
6. Does the firm's environment encourage its personnel to develop new marketing methods?

7. Access to finance

It is expected that firms with more financial resources are more willing to perform innovations because access to financial resources such as bank loans or government subsidies allow firms to be more able to implement innovations through financing their R&D activities or through upgrading their machinery and equipment. Hence, firms with more financial resources own more advanced and costly machines. In this study, it is predicted that firms with more expensive machines are more able to perform innovations.

8. Obstacles to innovate

There are macroeconomic and microeconomic factors that deter innovation in the Palestinian industry. Starting with the microeconomic factors, the most prominent obstacle to innovate is the high cost of innovation, as discussed previously. Both product and process innovations require bulk costs in order to make changes to existing products and production processes,

or to adopt a new production method / new product that is associated with acquiring new machinery and equipment. Moreover, marketing innovations make an obstacle, especially in the foreign markets because Palestinian firms have limited access to information about ports, airports, and export markets. Consequently, Palestinian plastic firms could face a problem in marketing their new products, or in improving their marketing methods.

Concerning the macroeconomic factors that could deter innovations in the Palestinian plastic industry, these factors could be due to the strict taxation and legal procedures. Moreover, the economic or political situation could limit the market expansion, which results in the lack of sufficient budget and financing. In turn, all these obstacles could hinder firm from improving their products or production process.

The following questions could be asked about the obstacles to innovate in the Palestinian plastic industry:

The microeconomic factors:

1. Is it very costly to develop the firm's existing product or to produce new products?
2. Is it very costly to develop existing production methods or to come up with new ones?
3. Does the firm suffer from marketing its new products?
4. Does firm suffer from developing new marketing methods?

The macroeconomic factors:

5. Are legal procedures and tax legislation negatively influence the development process?
6. Does the economic situation in Palestine negatively influence the development of new products?
7. Does the economic situation in Palestine negatively influence the process of developing new production processes or methods?
8. Does your business lack sufficient budget and finance for innovation due to the current economic situation in Palestine?

2.10.3 Age & Size

It is found from the literature that larger firms are able to obtain great savings and own more internally generated funds, which allow them to invest in risky R&D projects and to benefit from the economies of scale. On the other hand, smaller firms suffer from the lack of internal sources and funding and have a weak position in the market. Thus, this increases the possibility for larger firms to perform innovations (Huang, Arundel & Hollanders, 2010; Kirner, Kinkel & Jaeger, 2009; Jenssen & Nybakk, 2009; Zemplinerová & Hromádková,

2012).

Concerning the age, older firms own more knowledge and relationships with external sources that make it easier for them to perform innovations. Moreover, older firms are more likely than younger firms to employ knowledge that allow firms to turn it into innovation activities (Calantone, Cavusgil & Zhao, 2002; Nybakk, 2012)

Thus, in this research, it could be predicted that bigger and older firms are more likely to perform innovations, where age is measured by years of operation, and the size is measured by the number of labor in the last year.

2.10.4 Performance of Plastic firms and the Outcomes of Innovation (The dependent variables)

Practicing innovation is expected to be measured through the performance of the firm over a certain period. In this study, the period 2012 – 2014 is considered to evaluate the change in the variables that are related to the firm's performance. The following variables are considered in this study to represent the performance of the firm: market share, sales, revenues, exports, the number of external markets, and the number of employees.

This study expects that innovation has a positive impact on the employment, exports, external markets, market share, sales, and revenues.

Concerning the performance of innovation, changes in product innovation consist of the change in the number of products that have been increased and changes in their shape or physical characteristic over a certain period. Moreover, changes in process innovation consist of any changes in the production processes or procedures for certain product/ products over the period 2012 – 2014.

In addition, the performance of the firm can be divided into two types: economic and organizational performance. The economic performance of the firm consists of various indicators such as profitability of the firm, growth, competitiveness, strategic position and market share. On the other hand, organizational performance indicators are the relationships of the firm with its suppliers and distributors, the employee's adaptation to the firms' environment and the ability to learn.

In this study, a positive relationship between innovation and performance is expected. However, this study also expects that product innovation has more impact on the performance than process innovation (Rosli & Sidek, 2013).

The following questions could be asked about the firm's behavior concerning organizational and economic performance in the Palestinian plastic industry:

Organizational performance:

1. Did the firm improve its relations with suppliers of raw or intermediate materials?
2. Does the firm has good relations with its products distributors?
3. Do employees enjoy a high degree of adaptation to the firm environment?
4. Does the staff have a high ability to learn?

Economic performance:

1. Was the firm very profitable?
2. Did the firm achieve rapid growth?
3. Did the firm improve its competitiveness?
4. Did the firm strengthen its strategic position?
5. Did the firm significantly increase its market share?

In addition, this study will illustrate the impact of innovation on the firm's competitive advantage because the main goal of innovation is to achieve competitive advantage. The competitive advantage indicators in this study are evaluated according to the performance of the competing firms in terms of the speed of response to new customer needs, the ability to tailor products/services to individual customer needs, the speed of entering new markets and the rate of introducing new products or production processes. Thus, it the study hypothesize that innovation contributes significantly to the firm's competitive advantage.

The following questions could be asked about the competitive advantage in the Palestinian plastic industry:

1. Does the firm response to new customers' needs better than its competitors?
2. Does the firm has the ability to tailor products/services to individual customer needs better than its competitors?
3. Does the firm has the ability to enter new markets faster than its competitors?
4. Does the firm introduce new products/services into the market more than competitors?

The relationships between the variables are displayed in the figure below.

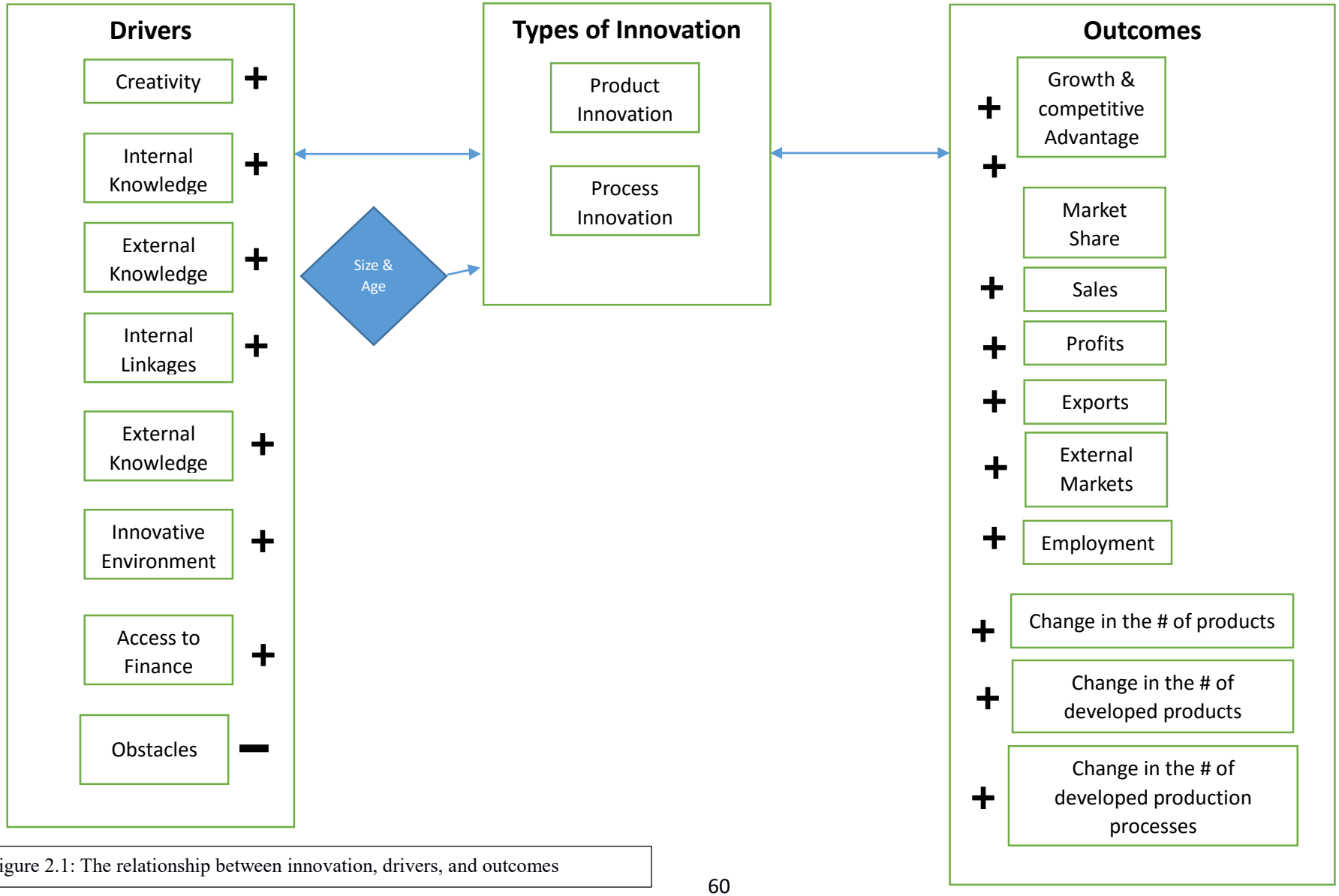

Figure 2.1: The relationship between innovation, drivers, and outcomes

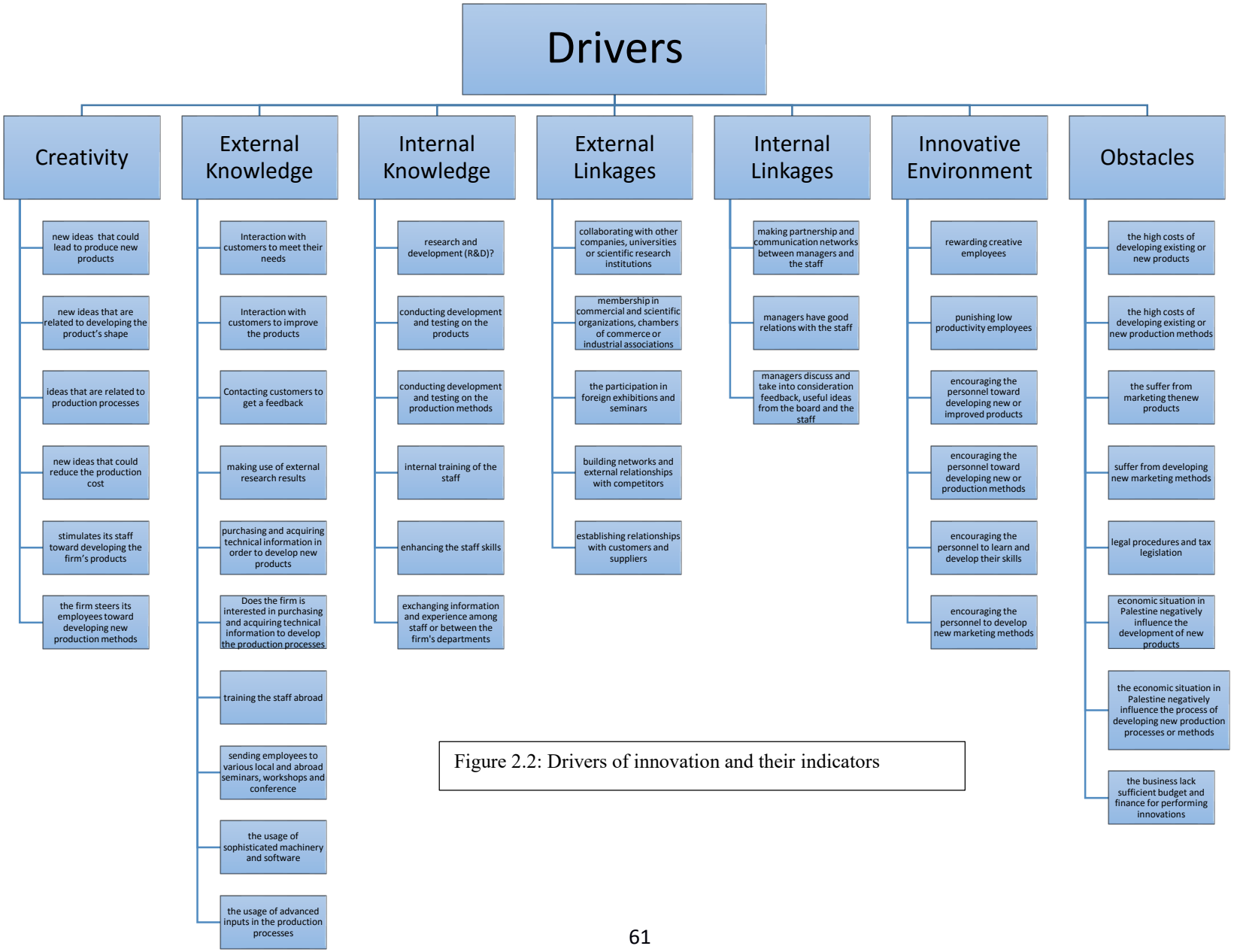

Figure 2.2: Drivers of innovation and their indicators

Chapter 3

Research Methodology

3.1 Introduction

In this chapter, the research methodology is discussed in detail. The research approach and design used in this study are discussed first. Also, a clear picture about the type and quantity of the data used in the study is analyzed and discussed. Then, the research setting explains the place and the environment where the study had taken place. After that, the sampling process explains the unit of analysis used in the study, time horizon, sampling procedure, sampling design, the sample frame, and the sample size. Finally, the data collection section is explained in detail.

3.2 Research Approach, Design & Setting

This study is considered a descriptive one because it is designed to collect data to describe a certain situation of the Palestinian Plastic Industry in the West Bank. Another point is that this study intended to investigate the relationships between several variables such as innovation (product & process innovation), knowledge (internal & external knowledge), linkages (internal & external), firm environment (culture), firm performance, employment, exports and the competitive advantage, which will be defined in the questionnaire.

Both quantitative and qualitative approaches were followed in this study. Quantitative variables used in the study to determine the change in the firms' performance during 2012 – 2014. On the other hand, qualitative data such as assessment of attitudes, behaviors, and opinions were collected in order to test the trends and the relationships

between the variables. Hence, this research is based on the measurement of quantity or amount of a qualitative phenomenon (Sekaran & Bougie, 2013; Kothari 1990).

This study was conducted in all the West Bank districts that contain plastic firms in order to include the biggest number of still working firms. Most of these firms or factories are not working in clusters or industrial zones, but they operate in residential areas and buildings in the ground floors without any signs that indicate their name. This could be due to the tax evasion.

According to Sekaran & Bougie (2013), it is necessary to decide the unit of analysis because once it is determined, the research questions, data collection methods, sample size, and variables will be determined in the framework. In this study, the unit of analysis is the whole firm. Therefore, the questionnaire is designed to ask the firm's owner or the executive manager about various descriptive qualitative and open-ended questions that are related to the theoretical framework variables. With regard to the time horizon of the study, it is a cross-sectional one because it was undertaken only once over a period of months in the year 2015.

According to the sources of data used in this study, both secondary and primary data were collected to build up this research. Secondary data used in this study were gathered from published sources by PCBS or unpublished data, which include government publications, raw data from PCBS, industrial surveys data from PCBS, Palestinian Federation of Industries publications, government reports, public records and statistics, reports and publications of various associations connected with business and industry. From those secondary data, the research problem has been clearly stated. The literature review depended on similar and empirical studies about innovation in the industry. According to the primary data, it was collected using administrated questionnaire and structured interviews with the firms' owners or engineers, which conducted to ask about needed information.

3.3 Sampling

This research is based on random sampling technique where each member of the population has an equal chance of being selected. The researcher will make direct contact with firms or using of telephone and e-mails for remote firms.

Due to the ambiguous and the limited number of Plastic firms and factories in the West Bank, the sample in this study tried to include all the plastic firms, and each firm represents a single element of the population. All the population is included in the sample because the population size of plastic firms is unknown. In order to know the real number of working plastic firms in the West Bank, a statistical data were obtained from the PCBS. Moreover, several contacts were conducted with all Chambers of Commerce to get a clear picture of the real number of plastic firms in each district plus their addresses, telephone or fax numbers and email addresses in order to ease the contact with plastic firms.

Concerning the bias, a natural bias took place in this study because some respondents may misrepresent and exaggerate the data in the questionnaire such as the number and the total cost of working machines. Hence, this study may contain downward bias in the income data and upward bias in the cost of machines used in production or the firm performance to give a good image of that firm. According to Kothari (1990), he argued that people tend to understate their incomes if the question asks about tax purposes. Firms' owners tend to inflate the cost of machines used in production due to the fear of government taxation.

3.4 Data Collection

The measurements in this questionnaire are based on the third edition of the Oslo manual besides existing measures from the literature. Based on Sekaran & Bougie (2013), the authors pointed that using of existing measurement scales save time and energy. Moreover, these existing measures allow to verify others findings and build on others' work.

The concepts in this study are operationalized into dimensions and then each dimension is operationalized into its elements that were used in questionnaire questions. The questionnaire was built on innovation measurements taken from the third edition of the Oslo manual besides existing measures and questionnaire from the previous studies included in the literature. It was edited and reviewed in English several times with the help of the supervisor and other instructors from abroad (Dr. Ian Jackson & Dr. Ahmad Mlouk from Staffordshire University and Prof. Marina Dabić from University of Zagreb

– Faculty of Economic & Business). Then, the questionnaire was rewritten in Arabic and distributed to plastic firms (see the Appendices).

The questionnaire contains four main parts with structured questions, which there are definite, concrete, and pre-determined questions in each part. The first part asks the firm manager or CEO (firm is the unit of analysis) general and descriptive information about the firm. According to the types of these questions, most of them are nominal, ratio and interval scales.

The second part asks about the changes in the firm's main export destinations, the size of exports, sales, profits, and market share during 2012 & 2014. Concerning the type of these questions, the balanced rating scale used to identify the degree of the increase or decrease in the number of products, exports, market share… etc.

The third part is related to the actual performance of product and process innovations where it asks about the number of products produced for each product line, the number of products that had been developed or changed their shape or physical characteristics during 2012 & 2014.

The fourth part of the questionnaire contains several questions about the main variables, which discussed previously in the literature to test the expected relationships between the variables. Each question represents a single variable, and each one contains several five-point Likert scale questions that represent the element of each domain. These Likert scale questions are used to explain how strongly the respondents (firms) agree or disagree with each statement on a five-point scale.

3.5 Measurement

The measurements in this study are based on the third edition of the Oslo manual for measuring innovation and innovation activities. OECD & Eurostat (2005) collected innovation data based on the organizational level where innovation activity decisions are made. Hence, the firm will be the statistical unit as discussed previously because it is the place, where innovation activities are usually organized. This firm unit is a single legal unit that engages only in one kind of economic activity "Plastic industry".

The questionnaire included four main sections, and each section contains a number of questions related to each section as follow:

1. General Information about the firm: this section intended to collect general information about the firm such as the size, age, and type of the firm that could be used for more detail descriptive results. All of these measures are developed based on the Oslo manual standards (OECD-Eurostat, 2005). The variables included in the questionnaire in the first part are:

- **Age of the firm:** the firm's age, it was measured through the year of establishment.
- **Geographic location:** firms' locations according to the administrative divisions of the provinces or districts in the West Bank.
- **Firm's owner's previous profession:** asks whether the firm's owner or the CEO's previous profession is related to the plastic industry or not.
- **Firm owner educational level:** asks about the educational or academic level of the firm owner or the CEO.
- **Type of the firm:** firm owners were asked about the legal entity of their firms based upon a local classification that used by the Chambers of Commerce in the West Bank.
- **Number & cost of machines**: asks about the number of working machines during the last three years (2012 – 2014) plus their current total cost.
- **Sources of machines**: asks about the source of the machines used in production.
- **The number of labor force**: asks about the number of workers or employees during the last three years (2012 – 2014).
- **Size**: the size of the statistical unit will be measured based on the current number of employees (OECD & Eurostat, 2005).
- **Type of goods produced**: asks about which type or category of product lines the firms' produces, the firm owner can select more than one category if his/her firm produces more than one product line.

- **Selling destination:** asks about to whom the firm directly sells its final products such as directly from the firm to customers, wholesalers, retailers, export (include Israel) and other firms (include subcontracting).

2. Information about the current performance of the firm:

Kirner, Kinkel & Jaeger (2009) used the share of products or services sales introduced by the firm within the past 3 years because it could be a direct measure of product innovation performance. This section asks whether the firm's market share, sales, and profits were increasing or decreasing during 2012 & 2014. The Likert scale questions are used to measure the change in the annual market share, sales and profits for each type or category of product line on a five-point scale (increased substantially, increased somewhat, not changed, decreased somewhat, decreased substantially and don't produce).

3. Information about the distribution and performance of the exports:

- **Exports' share & the Number of export markets**: asks about whether the firm's export share and the number of external markets were increasing or decreasing during 2012 & 2014. The Likert scale questions are used to measure any changes in the exports for each type or category of products on a five-point scale (increased substantially, increased somewhat, not changed, decreased somewhat, decreased substantially and do not export).
- **Sales distribution and exports from total production:** asks the firm's owner or the CEO about the percentage of sales distribution and exports of each product line from total production in the local and external markets during 2012 & 2014. Local markets include the West Bank & Gaza Strip, where external markets include Israel, Jordan, other Arab countries, and foreign markets.

4. Information about the changes in products and production processes:

- **The number of products:** firm owners were asked about the number of their main types of product lines that the firm produced for each year during 2012 & 2014 to

indicate whether there is a change in the number of products under each product line.

- **Innovation:** Innovation output is difficult to measure. Moreover, it is difficult to identify the causes of innovation due to its complexity (Zemplinerová & Hromádková, 2012; Mazzarol, 2002).

In this study, it is necessary to determine whether the firm is innovative or not, experienced or involved in innovative activities, or actually implemented innovations. According to OECD & Eurostat (2005), the innovative firm is the firm that had implemented or introduced at least one innovation. Moreover, product or process innovator firms are the firms that introduced or implemented product or process innovation, respectively (OECD & Eurostat, 2005).

Due to the complexity and unfamiliarity with the term of innovation between Palestinian firms, questions that proposed innovation has been simplified in order to facilitate the answer and to measure the extent of innovations in firms. Thus, product innovations were measured through the number of products in each product line that witnessed an improvements or modifications to their existing products in terms of shape or physical characteristics (Pianta, 2005). On the other hand, process innovations were measured through the number of products in each product line that performed changes on their products in terms of changing or developing the production methods or processes.

5. Behavioral questions about innovation, drivers, obstacles, and the outcomes (impacts): The measurements of firms' behaviors are measured through several questions about the main variables that affect directly or indirectly the innovation process, the outcome of innovations and the obstacles to innovate. Each question represents a single variable, and each one contains several Likert scale questions that represent the indicators of each variable. These Likert scale questions are used to explain how strongly the respondents (firms) agree or disagree with each statement on a five-point scale.

- **Willingness to innovate:** innovation is measured with a five-point Likert scale questions: product innovation through developing and producing new products,

process innovation through developing and improving the production methods, product innovations when they are produced according to the market requirements and product innovation through the continuous change in the products' shape or design in order to enter new markets. Similarly, process innovation was measured through using new mechanisms at work in order to reduce the cost of production and process innovation through using the modern technology in the production. On the other hand, the non-technological innovations were measured through using of new methods in marketing and management.

- **Creativity:** Creativity is measured with a five-point Likert scale questions: production of new or unique products that the firm had developed and the continuous development of new products in terms of shape. In addition, it includes the continuous employment of novel ideas that could lead to improved or new production processes that reduce the production cost; the employment of ideas that could lead to use new methods or processes in production, the firm encourages its workers to develop new products, and the staff encouragement of using new methods of production.
- **Knowledge:** Concerning to the theoretical framework, this variable contains two major domains: external knowledge, internal knowledge. Regarding the R&D measurements, it included the engagement in basic and applied research to gain new knowledge in order come up with new inventions or modifications to existing products of techniques. Firms can implement these R&D activities inside the firm or acquired from external sources. R&D indicators are the most widely used to measure the innovative activity, but R&D cannot be measured directly (OECD & Eurostat, 2005; OECD, 2009; Zemplinerová & Hromádková, 2012).

However, OECD & Eurostat (2005) stated that R&D activities include development & testing, further research to modify technical functions or designs. In the questionnaire, firms will be asked if they had performed in-house R&D and non-R&D activities, acquired knowledge from outside sources if the firm does not involve in R&D activities. Then, the internal and external knowledge importance to innovation will be measured through the interval scale, which measures the responses of various items

and statements through identifying which statement the firm agree more with (Sekaran & Bougie, 2013).

In this study, knowledge was measured with a five-point Likert scale questions divided between internal and external sources of knowledge.

a. **Internal sources of knowledge:** includes knowledge created through internal research and development, knowledge created through the development and testing of the products, knowledge created through the development and testing of the production methods or processes, knowledge gained from training the staff, and skills gained from enhancing and the internal training of the staff. Moreover, it includes knowledge obtained from the usage of new and sophisticated machinery and software, knowledge obtained from exchanging information and experience among the staff and knowledge or skills gained through using advanced intermediary inputs in the production process. Svetina & Prodan (2008) used those measures to assess the internal knowledge.

b. **External sources of knowledge:** includes knowledge gained from the interaction with customers, knowledge gained from customers that tend to improve the products and knowledge obtained from customers' feedback. Moreover, it includes knowledge obtained from external scientific research results, knowledge obtained through purchasing and acquiring technical information in order to produce new products, and knowledge obtained through purchasing or acquiring technical information in order to develop the production processes. In addition, in contains knowledge gained from the external or abroad training of the staff, and knowledge gained from local and abroad seminars, workshops, or conferences. Those measures are also used by Svetina & Prodan (2008) & Nybakk (2009).

- **Linkages in the innovation process:** Nybakk (2009) measured the level of linkages and interaction with institutions at both local and national levels to adopt innovations and changes in micro-firms. According to OECD & Eurostat (2005), questions about the linkages may apply to all types of innovation in the aggregate and micro-level. However, other types of innovations are related directly to product and process innovation. In this study, linkages were measured with a five-point Likert scale questions divided between questions about internal and external linkages.

a. **External linkages**: includes the collaboration with other companies, universities, or scientific research institutions to develop the production, the membership in commercial and scientific organizations, chambers of commerce, or industrial associations. Moreover, it includes the participation in foreign exhibitions and seminars, building networks and external relationships with competitors and linkages through establishing relationships with clients or suppliers.

b. **Internal linkages**: internal linkages through making partnership and communication networks between managers and the staff, internal linkages through making relationships between the firm's departments, managers, and the staff. Moreover, it includes linkages through the discussion with managers and taking into consideration feedback and useful ideas from the board and the staff.

- **Organizational Environment:** in this study, the firm's innovative environment is measured with a five-point Likert scale questions: the environment with a rewarding system for its creative employees or workers, and the environment that punishes its low productivity employees. Moreover, it includes the environment that encourages its employees to develop new products, the environment that encourages its employees to develop new production methods, the environment that encourages its employees to learn and develop their skills, and the environment that encourages its employees to develop new marketing methods. Those measures were already used by previous studies (Grabowski et al., 2013; Lin, 2007; Nybakk, 2009).

- **Obstacles to innovate**: obstacles to innovate were measured with a five-point Likert scale questions that related to macro and micro economic obstacles in Palestine based on the literature and the interviews. The microeconomic factors are the cost of developing existing products, the cost of developing existing processes, marketing problems, and the problem of developing new marketing methods. On the other hand, the macroeconomic factors are the legal and taxation issues, the effect of the economic situation in Palestine on developing new products, new production processes, and its role in the lack of sufficient budget to finance innovations.

- **Organizational Performance**: the organizational performance of the firm is measured with a five-point Likert scale questions: the firm's good relations with its suppliers of raw or intermediate materials, the firm's good relations with its products distributors, the firms enjoys a high degree of adaptation to the firm environment and the staffs' high ability to learn.
- **Economic Performance:** Based on Svetina & Prodan (2008) in measuring the economic performance of the firms, this study measured the economic performance with a five-point Likert scale questions: profitability, growth, competitiveness, strategic position, and market share.
- **Competitive advantage:** the competitive advantage of the firm is measured with a five-point Likert scale questions: the ability to respond quickly to new customers' needs, the ability to tailor products/services to individual customers' needs, the speed of entering new markets and the rate of introducing new products/services in the market.

3.6 Field Work

A structured personal interview was conducted with Royal Company in November 2014 (the biggest plastic company in the West Bank) where a set of predetermined questions were asked to the companies' chief engineer about the Palestinian plastic industry and the firm. Moreover, unstructured interviews were conducted with other plastic firms after or before completing the questionnaire. In addition to that, other unstructured interviews were conducted with Plastic and sanitary retailers in order to reveal the contradiction and approval with firms' opinions.

Distributing the questionnaire on plastic firms took place in different part of the West Bank from March 2015 until May 2015. The questionnaires were filled through making visits to the firms and talking with their managers to fill in the questionnaire in order to avoid any difficulties in the questions and to increase the response rate. According to the firms that their managers pretended that they do not have time to fill up the questionnaire or are not easily approachable on time, they were contacted by telephone and questionnaires were e-mailed to them with a request to reply after completing the

questionnaire. The last question in the questionnaire asks about any notes that are not listed in the questionnaire where answers are in respondents' own words.

3.7 Data Analysis

The analysis of the survey data is processed using IBM SPSS V.21. The statistical analysis includes descriptive statistics, split sample descriptive, one-way ANOVA t-test, and Pearson correlation. The first test is used to give general descriptive results about the firm's characteristics, their performance, innovations, exports, attitudes toward innovation drivers, and obstacles to innovate. The data is categorized into innovative investor and non-innovative firms, and the same descriptive statistical analysis is performed to provide comparisons between the firms in terms of characteristics, innovation drivers, performance, and outcomes of innovation. The one-way ANOVA t-test is used to determine if there is a difference between innovative and non-innovative firms in terms of characteristics, innovation drivers, and outcomes. The Pearson correlation analysis is used to support the testing of relationships between the variables. It is used in order to determine if there is a relationship between innovation drivers (independent variables) and innovation (dependent variable) on one hand, and between innovation (independent variable) and outcome of innovation (dependent variables) on the other hand.

3.8 Reliability & Validity

According to Sekaran & Bougie (2013), reliability refers to how well the data collection instrument that is developed measures whatever it is measuring when used in a similar setting, and it is concerned with the consistency and stability of measurement. On the other validity refers to how accurate the instrument measures, what was intended to measure, and it is concerned with whether we measure the right concept (Golafshani, 2003).

In order to ensure that the questionnaire measures the right data, a pilot study had been conducted a week prior to data collection phase. This pilot study was conducted on wood

and furniture industry to reveal any weakness or difficulty in the questions, and to be sure that the questionnaire will collect relevant information. As stated by Kothari (1990), questions throughout the questionnaire must be impartial to avoid any bias in the measurement. After that, questions formulation and wording were enhanced through investigating unclear and difficult questions, which had been reworked to become more understandable and easier. This was done to ensure that collected information from the questionnaire is correct, and there are no random answers.

Questionnaire reliability was measured by using the Cronbach Alpha that estimates the internal consistency & liability of the questionnaire sets of items when they are administered to a particular group under particular conditions for a specific purpose. Moreover, it is used to estimate the proportion of variance whether it is systematic or consistent in a set of test scores (Brown, 2002). The alpha coefficient for the 66 items is .965, suggesting that the items have relatively high internal consistency.

2Table: 3.1: Reliability Statistics

Cronbach's Alpha	N of Items
.965	66

3.9 Study Limitations

The biggest problem that formed an obstacle in reaching plastic firms is that there was inaccurate and unreliable data. Lack of data is the main problem in this study. According to the list of plastic firms in The West Bank that Chambers of Commerce provided, information was not up to date about the working firms in each district. During the fieldwork, the researcher discovered that many of plastic firms on the list do not exist or had closed down, and many of the listed firms were commercial or importing firms. Moreover, most firms or factories do not work in clusters or in industrial zones, but most of them operate in residential areas and buildings on the ground floor without any signs that indicate the name of their factories; this could be attributed to the tax evasion. Another main problem that reduced the sample size that there was a high unresponsive rate (about 40%) where some firm's owners or managers refused to fill up the questionnaire.

Chapter 4

Data Analysis & Results

4.1 Introduction

In this chapter, data was collected through the questionnaire that was analyzed to extract meaningful results, which will serve the purpose of this study. This chapter contains six major sections: the first section will analyze the sample or firm's characteristics, which includes data from the first section of the questionnaire about plastic firm's characteristics. The second section provides an overview analysis of plastic production in the West Bank such as plastic product lines, products distribution, and the changes that accrued to this industry during the period 2012 – 2014. The indicators in that sector include market share, sales, profits, sales distribution, exports, and the number of external markets. Section three will provide a detailed analysis of the changes in the number of products, product and process innovations. Section four analyzes the behavioral variables to explore the directions and attitudes of the Palestinian plastic firms toward innovation, the drivers of innovation, obstacles to innovate and the changes that took place in the firms. Sections five and six conduct a comparative analysis of the results by using some statistical indicators such as percentages and mean values. Also, the relationships were tested between the dependent and independent variables using correlation analysis, and the one-way ANOVA t-test to determine the difference between innovative and non-innovative firms. Finally, the results were compared with the results of the previous studies, which reviewed in the theoretical framework.

4.2 Plastic Firms Characteristics

The Palestinian Plastic industry is concentrated in the south of the West Bank where about 70% of Plastic firms are located in Al-Khalil (Hebron) district. Next, comes Ramallah, which absorbs about 15% of plastic firms in the West Bank. On the other hand, the rest (15%) of plastic firms are scattered around other districts (Bethlehem, Nablus, Jenin, and Qalqiliah).

Concerning the age of Palestinian plastic firms, the mean age is 17.76 years where 60.8% of them were established prior to 2001. On the other hand, 39.2% of the firms were established after 2003 – after the second intifada.

In accordance with the past profession of the firms' owners, around 75% of the firms' owners acquired positions related to the plastic industry. Past professions are related mainly to workers who moved from one factory to another. On the other hand, 25% of the firms indicated that their owner's past profession is not related to the Plastic industry. In other words, 25% of owners had no prior experience in this industry and lack of prior technical support or marketing experience.

It was found from the sample analysis that 37.7% of the owners hold Bachelor degree and 34% have finished their secondary school education. Moreover, 18.9% of the owners only finished their preparative education, 7.5% hold a diploma degree or accomplished 2 years of university education, and only 1.9% of the owners hold master's degree.

Regarding the legal entity, 43.4% of plastic firms operate as private shareholding companies (which most of them are family business) and 1.9% are public shareholding companies. However, only 22.6% of plastic firms operate as partnerships or normal companies. In addition, 32.1% of the firms operate as a sole proprietorship (owned by one person).

In 2012, the mean (average) number of working machines in plastic firms was 11.6, which means that most plastic firms owned 11 machines. In the year 2013, this mean value had increased to 12.29 and kept increasing to 14.27 in 2014. This indicates that Palestinian plastic firms are experiencing a slight growth in the capital due to the increase in the local demand in general. This contradicts the previous statistical publications of the PCBS.

According to the cost of working machines, the mean value (average) of the cost of working machines is $398,109.09. Moreover, 93.2% of plastic firms their total cost of working machines did not exceed $1,000,000.

With respect to the source of these working machines, 35.6% of working machines were imported from European countries such as Belgium and Germany. On the other hand, 30.8% of working machines were imported from China, and 26% were imported from Asian countries such as Taiwan and Korea (the majority are from Taiwan). In contrast, 6.7% of working machines include re-manufactured and locally assembled machines, and only 1% of the machines come from Israel.

Concerning machines utilization, 71.2% of the firms use European machines. In addition, 61.5% of the firms employed Chinese machines and 51.9% used machines imported from Asian countries such as Taiwan. On the other hand, 13.5% of the firms depend on re-manufactured and locally assembled machines. According to the labor force, in the year 2012, the average number of workers in each plastic firm was 35.58 workers. In 2013, this average number of employees was increased very slightly to 37.96 and then to 41.91 in 2014. It could be concluded that there is a slight growth in the workforce and employment in the Palestinian plastic industry in parallel to the rise in using machines. Depending on the previous data, in the year 2012, the mean value of the labor-to-capital ratio was 2.55. This ratio was decreased in the year 2013 to 2.46 and then increased to 2.50 in the year 2014, which indicates that Palestinian plastic industry is considered a labor-intensive industry. In addition, it was found that 35.8% of plastic firms are micro firms, which employ less than 10 workers. Moreover, around the half (51%) of the firms are considered small firms (10 – 50 workers), whereas 9.4% are considered Medium-sized firms; employ between 50 – 250 workers. However, only 3.8% of the firms are considered big or giant firms (More than 250 workers). This indicates that the Palestinian plastic industry is dominated by small enterprises. Therefore, these findings are in line with previous studies findings (UNECE, 2004; Khalil, Aref & Bsharat, 2013).

4.2 Plastic firms' performance

4.3.1 Production

About 82% of the production is concentrated in six major product lines: Nylon, plastic boxes, sanitary ware & pipes, foam & mattresses, plastic housewares, and disposables. In the West Bank, Plastic Bags constitute the largest portion of production, which

accounts about 40% of the production. The next important product lines are the plastic boxes and sanitary wares & pipes, which account about 26% of total plastic production. About 13% of the plastic productions are plastic boxes that used for inputs for cleaning and food containers. In addition, the other 13% are sanitary ware & pipes that are used as water tanks and sanitary pipes. On the other hand, 5.8% of plastic production lies in producing foam and mattresses, 4.3% of plastic production are allocated to housewares. Similarly, 4.3% of production are directed to produce disposable plastic products such as disposable plastic cups, plastic food containers used for packaging purposes in restaurants and fast food delivery. However, the other 17.6% of the plastic production is scattered between different types of production lines; 2.9% for medical tools, 2.9% for plastic furniture such as tables and chairs, 1.4% for construction & building equipment such as polystyrene insulating materials, 1.4% for toys, 2.9% for recycled plastics and 5.8% for producing other products such as carpenters accessories, electrical tools and fiberglass.

It is clear from Table (4.1) that plastic production in concentrated in Plastic Bags which is considered a traditional product line that lacks innovations. The percentages according to the total production in the sample are summarized in the table below.

Table 4.1: The percentage of each product from the total production and the percentage of the firms that produce these products from the total firms in the sample

The Product Line	Percentage of production	The Product Line	Percentage of production
Plastic Bags	42.0%	Furniture	2.9%
Plastic Boxes	13.0%	Construction & building equipment	1.4%
Sanitary Ware & Pipes	13.0%	Toys	1.4%
Housewares	4.3%	Recycled Plastics	2.9%
Medical tools	2.9%	Disposable	4.3%
Foam & Mattresses	5.8%	Other	5.8%
Total	100%	Total	100%

*Source of data: calculated by the researcher

4.3.2 Products Distribution

Over the past three years, around 64% of the plastic products were allocated to local wholesalers, retailers, and customers; 35.2% of the sales were received by wholesalers, 14.8% to retailers and 13.9% are sold directly to final customers. On the other hand, 31.5% of the firms sell and export their products to external markets (including Israel),

where only 4.6% of plastic production were produced by subcontracting firms. Table (4.2) summarizes the distribution of plastic products from the total production in plastic industry.

Table 4.2: The percentage of distribution destination of plastic products from the total production and the percentage of the total firms in the sample

The Product is sold directly:	Percentage of production
from the firm	13.9%
to Wholesalers	35.2%
to Retailers	14.8%
to Exporters (include Israel)	31.5%
to Other Factories	4.6%

*Source of data: calculated by the researcher

4.3.3 Market Share

The overall market share of the plastic firms was increasing during 2012 – 2014. About 45% of the firms had experienced an increase in their market share. On the other hand, about 40% of the firms indicated that their market share for their products was decreasing during the same period. In contrast, 16% of the firms indicated that their market share tended to be constant. Table (4.3) displays the overall percentages of the responses to the change in the market share for all the product lines during 2012 - 2014.

Table 4.3: changes in market share for all product lines during 2012 & 2014

Responses	Percent
Decreased Substantially	14.5%
Decreased Somewhat	24.6%
Not Changed	15.9%
Increased somewhat	30.4%
Increased Substantially	14.5%
Total	100.0%

*Source of data: calculated by the researcher

The change in the market share for each product line is described as shown in Table (4.4) on the next page.

Table (4.4) shows that there are five product lines that witnessed an increase in the market share during the past three years, and they are medical tools, construction and building equipment, foam, plastic boxes, and housewares.

Construction tools, medical tools, foam, plastic boxes had witnessed the most increase in their market share, respectively. On the other hand, toys, plastic disposables, other products, and sanitary ware had witnessed a decrease in their market share, respectively.

This indicates that those product lines are facing strong competition from imported products.

Table 4.4: The percentage of change in the market share of plastic firms for each plastic product line during 2012 & 2014

Product line	Decreased Substantially	Decreased Somewhat	No Change	Increased Somewhat	Increased substantially	Mean Value
Plastic Bags	10.3%	24.1%	20.7%	37.9%	6.9%	3.07
Boxes	12.5%	12.5%	0%	50%	25%	3.63
Sanitary Ware	22.2%	33.3%	11.1%	22.2%	11.1%	2.67
Housewares	25%	0%	25%	0%	50%	3.50
Medical tools	0%	0%	50%	0%	50%	4.00
Foam	0%	25%	0%	50%	25%	3.75
Furniture	50%	0%	0%	0%	50%	3.00
Construction & building equipment	0%	0%	0%	100%	0%	4.00
Toys	0%	100%	0%	0%	0%	2.00
Recycled	50%	0%	0%	50%	0%	2.50
Disposables	0%	100%	0%	0%	0%	2.00
Other	25%	25%	50%	0%	0%	2.25

*Source of data: calculated by the researcher

4.3.4 Sales

Over the past three years, the sales of plastic firms were increasing. Around 52% of the plastic firms had increased their sales during 2012 - 2014. On the other hand, about 36% of the firms had witnessed a decrease in the sales. However, only 11.6% of the firms indicated that they did not witness any change in sales over the same period. Table (4.5) displays the overall percentages of the responses to the changes in the sales for all plastic product lines during 2012 - 2014.

Table 4.5: The percentage of change in sales for all product lines during 2012 & 2014

Responses	Percent
Decreased Substantially	10.1%
Decreased Somewhat	26.1%
Not Changed	11.6%
Increased somewhat	39.1%
Increased Substantially	13.0%
Total	100.0%

*Source of data: calculated by the researcher

The change in the sales for each of these product lines is described as shown in Table (4.6) on the next page.

Table 4.6: The percentage of change in the sales of plastic firms for each plastic product line during 2012 & 2014 line

The Product line	Decreased Substantially	Decreased Somewhat	No Change	Increased Somewhat	Increased Substantially	Mean Value
Plastic Bags	6.9%	31%	10.3%	44.8%	6.9%	3.14
Boxes	12.5%	12.5%	12.5%	37.5%	25%	3.50
Sanitary Ware	22.2%	33.3%	0%	33.3%	11.1%	2.78
Housewares	0%	0%	50%	25%	25%	3.75
Medical tools	0%	0%	50%	0%	50%	4.00
Foam	0%	25%	0%	50%	25%	3.75
Furniture	50%	0%	0%	0%	50%	3.00
Construction & building equipment	0%	0%	0%	100%	0%	4.00
Toys	0%	100%	0%	0%	0%	2.00
Recycled	50%	0%	0%	50%	0%	2.50
Disposables	0%	66.7%	0%	33.3%	0%	2.67
Other	0%	25%	25%	50%	0%	3.25

*Source of data: calculated by the researcher

There are five product lines that witnessed an increase in the sales during the past three years. These product lines are medical tools, construction & building equipment, plastic housewares, foam, and plastic boxes, respectively. On the other hand, toys, recycled plastics, disposables, and sanitary ware had witnessed the most decrease in sales, respectively.

4.3.5 Profits

While 11.6% of the firms increased their profits substantially, 26.1% of plastic firms suffered from a significant decrease in their profits over the past three years. On the other hand, 26.1% of the firms increased their profits moderately, where 21.7% of the firms had witnessed a moderate decrease in their profits. Table (4.7) displays the overall percentages of the responses to the change in the profits for all plastic product lines during 2012 - 2014.

Table 4.7: The percentage of change in the profits for all product lines during 2012 & 2014

Responses	Percent
Decreased Substantially	26.1%
Decreased Somewhat	21.7%
Not Changed	14.5%
Increased somewhat	26.1%
Increased Substantially	11.6%
Total	100.0%

*Source of data: calculated by the researcher

Changes in profits for each of these product lines are described as shown in Table (4.8).

Table 4.8: The percentage of change in the profits of plastic firms for each plastic product line during 2012 & 2014

The Product line	Decreased Substantially	Decreased Somewhat	No Change	Increased Somewhat	Increased substantially	Mean Value
Plastic Bags	34.5%	20.7%	10.3%	31%	3.4%	2.48
Boxes	12.5%	25%	25%	37.5%	0%	3.25
Sanitary Ware	22.2%	11.1%	22.2%	0%	44.4%	2.89
Housewares	25%	25%	0%	25%	25%	3.00
Medical tools	0%	50%	0%	0%	50%	3.50
Foam	0%	25%	0%	50%	25%	3.75
Furniture	50%	0%	0%	0%	50%	3.00
Construction & building equipment	0%	0%	0%	100%	0%	4.00
Toys	0%	100%	0%	0%	0%	2.00
Recycled	50%	0%	0%	50%	0%	2.50
Disposables	33.3%	33.3%	33.3%	0%	0%	2.00
Other	25%	25%	50%	0%	0%	2.25

*Source of data: calculated by the researcher

Table (4.8) shows that there are only four product lines that witnessed the most increase in the profits during the past three years. These product lines are construction and building equipment, foam, medical tools, and plastic boxes, respectively. On the other hand, toys, plastic disposables, Plastic Bags, other products, and recycled plastics had witnessed the most decrease in profits, respectively.

4.3.6 Exports (Sales to external markets)

Concerning exports, 22% of the firms do not have access to foreign markets and 78% of them exported and witnessed changes in their exports. On the other hand, around 22% of the firms suffer from a decrease in their exports. Table (4.9) displays the overall percentages of the responses to the change in the exports for all plastic product lines during 2012 – 2014.

Table 4.9: The percentage of change in exports for all product lines during 2012 & 2014

Responses	Percent
Don't Export	21.7%
Decreased Substantially	10.1%
Decreased Somewhat	11.6%
Not Changed	23.2%
Increased somewhat	21.7%
Increased Substantially	11.6%
Total	100.0%

*Source of data: calculated by the researcher

Changes in exports for product line are described as shown in Table (4.10).

Table 4.10: The percentage of change in the exports of plastic firms for each plastic product line during 2012 & 2014

The Product line	Don't Export	Decreased Substantially	Decreased Somewhat	No Change	Increased Somewhat	Increased Substantially	Mean Value
Plastic Bags	17.2%	6.9%	10.3%	31%	24.1%	10.3%	2.69
Boxes	12.5%	0%	0%	37.5%	25%	25%	3.38
Sanitary Ware	22.2%	44.4%	11.1%	11.1%	11.1%	0%	1.44
Housewares	0%	25%	25%	0%	25%	25%	3.00
Medical tools	50%	0%	0%	0%	0%	50%	2.50
Foam	25%	0%	0%	25%	25%	25%	3.00
Furniture	0%	0%	0%	100%	0%	0%	3.00
Construction & building equipment	0%	0%	0%	0%	100%	0%	4.00
Toys	0%	0%	100%	0%	0%	0%	2.00
Recycled	100%	0%	0%	0%	0%	0%	.00
Disposables	0%	0%	33.3%		66.7%	0%	3.33
Other	75%	0%	25%	0%	0%	0%	.50

*Source of data: calculated by the researcher

Only three product lines had witnessed an increase in the exports during 2012 - 2014. These product lines are construction and building equipment, plastic boxes and disposables, respectively. On the other hand, recycled plastics, other products, sanitary ware, toys, and medical tools had witnessed the most decrease, respectively. Depending on the interviews with these firms that produce plastic boxed, they indicated that Israel is their primary market for those product lines, which these products are used as packaging boxes for other industries such as food and cosmetics.

4.3.7 Changes in the number of external markets

During 2012 - 2014, the majority of plastic firms (79%) did not experience any change in the number of external markets. However, only about 9% of the firms had witnessed a decrease in the number external markets during the same period; 6% had experienced a significant decline, and 3% had a modest decrease. In contrast, only about 7% of the firms had increased the number of external markets; about 6% had a moderate increase and about 1% had a significant increase. Table (4.11) displays the overall percentages of the responses to the changes in the number of external markets for all plastic product lines.

Table 4.11: The percentage of change in sales for all product lines during 2012 & 2014

Responses	Percent
Don't Export	21.7%
Decreased Substantially	5.8%
Decreased Somewhat	2.9%
Not Changed	62.3%
Increased somewhat	5.8%
Increased Substantially	1.4%
Total	100.0%

*Source of data: calculated by the researcher

Changes in the number of external markets for each of those product lines are described as shown in Table (4.12).

Table 4.12: The percentage of change in the number of external markets for each plastic product line

The Product line	Don't Export	Decreased Substantially	Decreased Somewhat	No Change	Increased Somewhat	Increased Substantially	Mean Value
Plastic Bags	17.2%	6.9%	0%	75.9%	0%	0%	2.34
Boxes	12.5%	0%	0%	87.5%	0%	0%	2.63
Sanitary Ware	22.2%	22.2%	0%	44.4%	11.1%	0%	2.00
Housewares	0%	0%	0%	75%	25%	0%	3.25
Medical tools	50%	0%	0%	50%	0%	0%	1.50
Foam	25%	0%	0%	25%	25%	25%	3.00
Furniture	0%	0%	0%	100%	0%	0%	3.00
Construction & building equipment	0%	0%	0%	100%	0%	0%	3.00
Toys	0%	0%	100%	0%	0%	0%	2.00
Recycled	100%	0%	0%	0%	0%	0%	.00
Disposables	0%	0%	0%	66.7%	33.3%	0%	3.33
Other	75%	0%	25%	0%	0%	0%	.50

*Source of data: calculated by the researcher

The Table reveals that only two product lines had witnessed a very slight increase in the number of external markets during 2012 - 2014. These product lines are plastic disposables and housewares, respectively.

4.3.8 The Distribution of Internal & External markets

Mainly five products are absorbed by the Israeli market (NYLON, foam & mattresses, plastic boxes, housewares, and disposables). Israel is the primary external market for plastic firms in the West Bank that absorbed about 21% of the total plastic market, and

96% of the total external markets, which occupy the top destination for Palestinian exports (PalTrade, 2014). According to the medical tools, the main reason behind not exporting this product is due to the complex exporting procedures and the high international standards, which make it difficult for plastic firms to export this product. Table (4.13) below summarizes the percentages of each market for each plastic product line.

Table 4.13: The share of each product line by markets

Product	West Bank	Gaza Strip	Israel	Jordan	Arab Countries	Foreign Countries	Total
Plastic Bags	43.21%	2.72%	54.07%	0%	0%	0%	100%
Plastic Boxes	64.13%	2.5%	33.25%	0.12%	0%	0%	100%
Sanitary Ware	80.56%	12.2%	5.56%	0.56%	0.56%	0.56%	100%
Housewares	47.5%	3.75%	45%	1.25%	1.25%	1.25%	100%
Medical Tools	100%	0%	0%	0%	0%	0%	100%
Foam	42.68%	2.44%	50%	4.88%	0%	0%	100%
Furniture	62.5%	10%	27.5%	0%	0%	0%	100%
Construction & building equipment	100%	0%	0%	0%	0%	0%	100%
Toys	92%	8%	0%	0%	0%	0%	100%
Recycled Plastics	100%	0%	0%	0%	0%	0%	100%
Disposables	40%	20%	40%	0%	0%	0%	100%
Other	100%	0%	0%	0%	0%	0%	100%
Average	72.715%	5.1342%	21.282%	0.5675%	0.1508%	0.1508%	100%

4.4 Changes in the Number of Products, Products' Shape or Characteristics & Production Processes

4.4.1 Changes in the number of products for each product line

While firms in plastic industry tended to increase their number of products produced during 2012 – 2014, more than 53% of the firms did not increase the number of their products. On the other hand, only 46% of the firms had differentiated their products to increase their distribution such as boxes sanitary ware, housewares, foam, and disposables. On the other hand, there were no changes in the medical tools, furniture, construction, toys, and recycled plastics.

Table 4.14: The percentage of change in number of products for all product lines during 2012 & 2014

Responses	Percentage
No Change	53.6%
Increase	46.4%
Total	100.0%

*Source of data: calculated by the researcher

The change in the number of products for each of these product lines is described as shown in Table (4.15) on the next page.

Table 4.15: The percentage of change in the number of products for each plastic product line

The Product line	No Change	Increase	Total
Plastic Bags	63.3%	36.7%	100%
Boxes	42.9%	57.1%	100%
Sanitary Ware	44.4%	55.6%	100%
Housewares	25%	75%	100%
Medical tools	100%	0%	100%
Foam	25%	75%	100%
Furniture	100%	0%	100%
Construction & building equipment	100%	0%	100%
Toys	100%	0%	100%
Recycled	100%	0%	100%
Disposables	33.3%	66.7%	100%
Other	50%	50%	100%

*Source of data: calculated by the researcher

The Table shows that foam, plastic housewares, plastic disposables, plastic boxes, sanitary ware, other products, and Plastic Bags had experienced the most increase in the number of products produced for each of these product lines, respectively. On the other hand, Medical Tools, Plastic Furniture, Construction & Building Equipment, Toys and Recycled Plastics did not witness any change in the number of products during 2012 - 2014.

4.4.2 Changes in The Product's Shape or Physical Characteristics (Product Innovation)

During 2012 - 2014, most of the plastic firms (about 63%) did not change the shape or the physical characteristics of their existing products. However, only 37.1% of the firms had changed their products' shape or physical characteristics during the same period. Table (4.16) displays the overall percentages of the change in the products' shape or physical characteristics. Thus, it is clear that most of the Palestinian plastic product lines did not perform product innovations while only a few firms were able to perform product innovations. This result indicates that plastic firms are still producing traditional and low technology products.

Table 4.16: The percentage of change in the products' shape or characteristics for all product lines

Responses	Percent
No Change	62.9%
Increase	37.1%
Total	100.0%

*Source of data: calculated by the researcher

Changes in the products' shape or physical characteristic for each of these product lines are described as shown in Table (4.17).

Table 4.17: The percentage of change in products' shape for each plastic product line

The Product	No Change	Increase	Total
Plastic Bags	72.4%	27.6%	100%
Boxes	50%	50%	100%
Sanitary Ware	55.6%	44.4%	100%
Housewares	40%	60%	100%
Medical tools	100%	0%	100%
Foam	25%	75%	100%
Furniture	50%	50%	100%
Construction & building equipment	100%	0%	100%
Toys	100%	0%	100%
Recycled	100%	0%	100%
Disposables	66.7%	33.3%	100%
Other	50%	50%	100%

*Source of data: calculated by the researcher

The Table shows that Foam, Plastic Housewares, Plastic Boxes, Plastic Furniture, Sanitary ware, and disposables had witnessed some changes on their products in terms of shape or physical characteristics, respectively. The rest of the product lines did not witness any changes on their existing products in terms of shape or physical characteristics during 2012 - 2014. Changes in these product lines require new markets and large fix costs as a result of changing and acquiring new molds and machines. According to the recycled plastics, changing the shape of this product line is impossible because this product is used as raw material for other plastic products.

4.4.3 Changes in Production Processes (Process Innovations)

While the vast majority of the plastic firms (85.5%) did not change their production methods or possesses, only 14.5% of the firms had changed their methods or processes of production during 2012-2014. Table (4.18) displays the overall percentages of the responses to the change in the production processes for all plastic product lines.

Table 4.18: The percentage of change in the products' shape or characteristics for all product lines during 2012 & 2014

Responses	Percent
No Change	85.5%
Increase	14.5%
Total	100.0%

*Source of data: calculated by the researcher

The change in the production processes for each of those product lines is described as shown in Table (4.19).

Table 4.19: The percentage of change in the production process for each plastic product line

The Product	No Change	Increase	Total
Plastic Bags	93.1%	6.9%	100%
Boxes	87.5%	12.5%	100%
Sanitary Ware	77.8%	22.2%	100%
Housewares	75%	25%	100%
Medical tools	100%	0%	100%
Foam	50%	50%	100%
Furniture	100%	0%	100%
Construction & building equipment	100%	0%	100%
Toys	100%	0%	100%
Recycled	100%	0%	100%
Disposables	100%	0%	100%
Other	100%	0%	100%

*Source of data: calculated by the researcher

The Table shows that Foam had experienced the most increase in products that witnessed a change or improvements in their production processes. Then comes plastic housewares, sanitary wares, plastic boxes, and plastic bags, respectively. That means these product lines had employed the modern technology in their production. However, the rest of plastic product lines did not change their production processes. Hence, the majority of plastic production in dominated by low technology production processes.

Table (4.20) on the next page summarizes the mean values of the number of products produced, product innovations, and process innovations for each product line during 2012 - 2014.

From Table (4.20) it is clear that foam occupies the first place in the number of item products for each product line. After that come the plastic boxes in the second place and then Plastic Bags in the third place.

According to product innovations, changing the shape or physical characteristics of foam had the biggest mean value over the past three years, which means that this product

line occupied the first place in product innovations. The next two important product lines are plastic housewares and boxes, which have received mean values of 6.60 and 6.50, respectively.

According to process innovations, foam has the largest mean value in the year 2014, which means that this product line occupied the first place in process innovations. Then come plastic housewares and plastic boxes, which received mean values of 5.0 and 1.13, respectively. Hence, it is clear that product innovations are associated with process innovations, which this means that product innovations are associated with process innovations. And this don't contradict the interviews and open-ended questions in the questionnaire, which reported that changing the shape and the physical characteristic of the product or creating a new product requires a synchronized change in the molds (or templates), and changing the traditional production methods in new ways requires modern machines and equipment.

Table 4.20: The mean values of the number of products produced, product innovations and process innovations for each product line in the years 2012, 2013 & 2014

	Number of Products			Number of Changed Products			Number of Process Changed		
Product	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**
Plastic Bags	24.35	32.33	39.64	0.62	0.62	1.37	.00	.23	.30
Boxes	39	47.57	56.57	1.88	2.75	6.50	.00	1.25	3.13
Sanitary Ware	11.25	14.43	14.75	2.11	2.56	5.78	1.22	1.78	2.33
Housewares	16.33	17	19.33	2	4	6.60	2.5	3.75	5
Medical Tools	12.50	12.50	12.50	0	0	0	0	0	0
Foam	43.50	52.00	77.00	5	10	22.5	.00	2.50	7.50
Furniture	40	45	50	0	0	0	0	0	5
Construction & building equipment	3	3	3	0	0	0	0	0	0
Toys	3	3	3	0	0	0	0	0	0
Recycled	1	1	1	0	0	0	0	0	0
Disposables	6.67	6.67	8	0	0	0.33	0	0	0
Other	9.25	10.25	11.50	0	0	1.25	0	0	0

*Source of data: calculated by the researcher

4.5 Statistical Indicators of the Behavioral Variables

This section will explain and describe the most important indicators that influence innovation and its outcome in the Palestinian plastic industry. These indicators are based on the theoretical framework, which will explain the directions of the Palestinian plastic firms' behaviors toward adopting innovations inside this industry.

4.5.1 Innovation

Table (4.21) on the next page, depicts the indicators of the extent of Palestinian plastic firms to innovate by calculating the mean value of each type of innovation.

Table 4.21: percentages, mean values, standard deviations and variances of product & process innovation elements

Innovation	Disagree	Neutral	Agree	Mean Value
One of the firm's priorities is to develop new products (Pd)	37.7 %	15.1 %	47.1 %	3.04
The firm develops its own production methods (Pr)	41.5 %	11.3 %	47.2 %	2.91
The firm improves its own production methods (Pr)	41.5 %	5.7 %	52.8 %	3.02
The firm produces new products quickly according to the market requirements. (Pd)	30.2 %	15.1 %	54.7 %	3.30
The firm continuously adjusts the design of their products to enter new markets. (Pd)	45.3 %	13.2 %	41.5 %	2.87
The firm is interested in using new mechanisms at work to reduce the production cost. (Pr)	24.5 %	13.2 %	62.2 %	3.55
The firm is interested in using the modern technology in the production process. (Pr)	35.8 %	9.4 %	54.7 %	3.11
The firm is interested in using new methods of marketing. (Mi)	43.4%	17 %	39.6 %	2.66
The firm is interested in using new methods of management. (Oi).	45.3%	13.2 %	41.5 %	2.74
Product Innovation	37.73 %	14.46 %	47.76%	3.07
Process Innovation	35.83%	9.9%	54.23%	3.15
Innovation	38.36%	12.58%	49.03%	3.022

*Pd: product innovation. Pr; process innovation Mi: Marketing innovation, Oi: Organizational innovation

From Table (4.21) it is clear that the majority of the Palestinian plastic firms in the sample have very slight positive attitudes toward innovation whether it is product innovation or product innovation. Moreover, the mean values for product and process innovation are 3.07 and 3.15, respectively. This result means that Palestinian plastic firms have a very slight willingness to innovate; where around the half of the firms (around 49%) have a positive willingness to innovate in general.

According to the process innovations, from Table (4.21) it is clear that plastic firms have a very slight positive responses toward process innovation elements except the strong interest in using new machines to reduce the production costs. It is clear that most of the firms (about 62%) are interested in using new mechanisms at work in order to reduce their production costs. The Table shows that the mean value of this element is 3.55, which that means Palestinian plastic firms' managers have a strong attitude toward using new mechanisms at work in order to reduce the cost of production. This result could be explained that Palestinian plastic firms are interested in reducing their production cost by adopting process innovations through acquiring new and advanced machines and

technology. This conclusion was found in previous Palestinian studies (Palestine Monetary Authority, 2014; PalTrade, 2014; Palestinian Federation of Industries, 2009; Palestinian Federation of Industries, 2004; Sabri, 1999; Royal, Personal Communication, November 30, 2014; PCBS, 2014; Khatib et al., 2013).

According to product innovations, less than 50% of Palestinian plastic firms (47.1% & 45.7%) have the interest to develop new products and have a willingness to produce new products rapidly to enter new markets, respectively. Hence, plastic firms have moderate attitudes toward developing new products and slightly positive attitudes toward producing new products according to the market requirements. Thus, this indicated that plastic firms are more interested in developing and producing new products according to the market requirements rather than producing unfamiliar or new products. Also, these firms have a poor and weak attitudes toward responding to the market by changing and adjusting their products design in order to penetrate new markets. This could be explained by the high cost of changing the product design or the molds that are used in the production, which associated with changing the production methods.

In relation to the non-technological innovations, the results demonstrate that Palestinian plastic firms have weak motivations to perform non-technological innovations. Moreover, the results show that Palestinian plastic firms are slightly more willing to perform organizational innovations than marketing innovations.

4.5.2 Creativity

Table (4.22) on the next page, shows to what extent the Palestinian plastic firms used and interested in adopting new, creative ideas and procedures in the production. It is clear that most of the Palestinian plastic firms are not interested in adopting creativity tools in their work. Less than 50% of the firms agreed upon employing new and creative ideas in their production processes to reduce the cost and improve their products or production processes. The mean value of the firm's new ideas and creativity is 2.9, which means that Palestinian plastic firms have mild weak attitudes toward employing new creative procedures and novel ideas of works.

Reducing the cost of production through contagiously improving the production processes remains the main priority for plastic firms, where around 60% of the firms agreed upon this point with a mean value of 3.19. This means that plastic firms have

very slight attitudes toward this point. The next important element is the encouragement of staff toward developing new products, producing unique products and developing the products' shape, respectively.

Table 4.22: Percentages and mean values of creativity indicators

Creativity	Disagree	Neutral	Agree	Mean Value
The firm is always interested in producing new products that others didn't produce	43.4%	7.5 %	49 %	2.94
The firm continuously develops its products in terms of shape	39.6%	17 %	43.4 %	2.91
The firm continuously improves its production processes that reduce production cost	30.2%	9.4 %	60.3 %	3.19
The firm is interested in using new methods to reduce the production cost.	50.9%	13.2 %	35.8 %	2.55
The firm stimulates its staff toward developing the firm's products	34%	18.9 %	47.1 %	2.98
The firm steers its employees toward developing new production methods	41.5%	13.2 %	45.3 %	2.75
The firm's new ideas and creative ideas	39.93%	13.20%	47%	2.89

According to the elements of creativity, all of them showed weak attitudes toward creativity except the employment of creative methods of production to reduce the cost. Plastic firms have poor attitudes toward changing the production processes, were only about 36 % of the firms agreed upon this point. This could be due to the burden of the bulk cost of machinery and the high fixed cost. On the other hand, there is a contradiction between the interest in using new methods of production and the interest to acquire new machines to reduce the production cost. This finding was supported by the interviews and open question in the questionnaire. The majority of the firms explained that it is not possible to for them to change their production processes, because this corresponds with changing the machines, and there is a standard way of production.

4.5.3 Internal Knowledge & Information

Table (4.23) on the next page, illustrates to what extent the Palestinian plastic firms shared and used the internal sources of knowledge inside their boundaries. The Table shows that Palestinian plastic firms have positive attitudes towards using and exploiting the sources of internal knowledge and information. Hence, Palestinian plastic firms have a positive willingness towards utilizing the internal knowledge within their boundaries. Moreover, there is a discrepancy between the elements. The most important element of the internal knowledge is the knowledge that acquired from developing and testing the

products. The second important thing is the interest in exchanging information and experience among staff where about 74% of the firms agreed with this point. Next, in importance comes training the staff and then the interest in enhancing their skills, were about 68% and 60% of the firms agreed upon these points, respectively.

Table 4.23: Percentages and mean values of internal knowledge indicators

The firm's internal knowledge & information	Disagree	Neutral	Agree	Mean Value
The firm is concerned about the research and development (R&D)	26.4 %	17 %	56.6 %	3.34
The firm conducts development and testing on its products	7.6 %	9.4 %	83 %	4.00
The firm conducts development and testing on its production methods	26.4 %	22.6 %	50.9 %	3.15
The firm is interested in training its staff	15.1 %	17 %	67.9 %	3.58
The firm is interested in enhancing its staff to acquire new skills	16.9 %	22.6 %	60.4 %	3.51
The firm is interested in using sophisticated machinery and software	37.8 %	15.1 %	47.2 %	2.94
The firm is interested in using intermediate and advanced inputs in the production processes	41.5 %	18.9 %	39.6 %	2.83
The firm is interested in exchanging information and experience among staff	13.2 %	13.2 %	73.6 %	3.81
The firm's new ideas and creative ideas	23.113 %	16.975%	59.9 %	3.3962

Hence, Palestinian plastic firms have positive attitudes toward using these elements of internal knowledge and information within their boundaries. Moreover, plastic firms showed very slight positive attitudes toward adopting research and development, and moderate attitudes toward testing and developing the production procedures or processes. On the other hand, plastic firms have mild poor attitudes toward using the advanced technology and inputs in their production processes.

4.5.4 External Knowledge & Information

Table (4.24) on the next page, presents how plastic firms are interested in employing the external sources of knowledge and information.

It is clear that Palestinian plastic firms have very poor interests or attitudes toward using the external sources of knowledge and information, which are necessary to develop the products and the production processes in the firms. Only about 35% of the firms showed a positive interest in employing the external knowledge sources in the production process. This indicates that Palestinian plastic firms do not use or exploit the sources of external knowledge that contribute to the firm's overall knowledge. Moreover, there is a discrepancy between the elements. We see that Palestinian plastic firms have a positive attitude toward acquiring external knowledge from their customers to meet their needs.

Also, firms showed slightly positive attitudes toward acquiring knowledge, information and feedback from their customers or suppliers to improve their products. On the other hand, there is a poor interest in using the result of external research results in developing the production and in gaining knowledge through sending employees to local and abroad seminars, workshops & conferences. Thus, the Palestinian plastic industry is considered a closed one because plastic firms have a very poor interests in training their staff aboard, purchasing and acquiring technical information in order to develop new products, purchasing and acquiring technical information in order to develop new products where only about 13% to 19% of the firms agreed upon these points.

Table 4.24: Percentages and mean values of internal knowledge indicators

The firm's external knowledge & information	Disagree	Neutral	Agree	Mean Value
The firm obtains information from its customers to meet their needs	18.9 %	9.4 %	71.7 %	3.62
The firm obtains information from customers to improve its products	30.2 %	9.4 %	60.3 %	3.34
The firm takes feedback from its customers and suppliers	34 %	15.1 %	50.9 %	3.19
The firm is concerned about making use of external research results	60.3 %	5.7 %	33.9 %	2.32
The firm is interested in purchasing and acquiring technical information to develop new products	75.4 %	5.7 %	18.9 %	1.77
The firm is interested in purchasing and acquiring technical information to develop the production processes	79.2 %	3.8 %	17 %	1.74
The firm is interested in training its staff abroad	84.9 %	1.9 %	13.2 %	1.60
The firm is interested in sending its employees to various local and abroad seminars, workshops, and conferences.	62.3 %	24.5%	13.2 %	2.02
The firm's external knowledge & information	**55.65 %**	**9.44%**	**34.9%**	**2.2288**

4.5.5 External linkages

Table (4.24) on the next page, depicts to what extent Palestinian plastic firms made and established external linkages, networks or relationships with their stakeholders.

The Table shows that the mean value of the external linkages is 3.26, which means that Palestinian plastic firms in the West Bank have very slight willingness toward establishing external linkages with other stakeholders. In detail, plastic firms do not collaborate with other companies, universities, or scientific research institutions to develop production processes. On the other hand, about 87% of the plastic firms are highly concerned about their membership in commercial and scientific organizations, chambers of commerce or industrial associations and establishing relationships with their customers and suppliers. However, plastic firms have a very slight willingness to

participate in foreign and local exhibitions and seminars besides having a moderate position in making networks and external relationships with their competitors. In contrast, plastic firms have a poor or negative attitude toward collaborating with other companies, universities or scientific research institutions to develop their production processes where only 26.4% & of the firms agreed, and 60.4 % disagreed with this point. Thus, these indicators sign that plastic firms are bearing the cost to invest in obtaining knowledge and develop mutual relationships with universities, scientific research institutes and with other firms.

Table 4.24: Percentages and mean values of external linkages indicators

The firm's external linkages & information	Disagree	Neutral	Agree	Mean Value
The firm collaborates with other companies, universities or scientific research institutions to develop its production processes	60.4 %	13.2 %	26.4 %	2.25
The firm is concerned about its membership in commercial and scientific organizations, chambers of commerce or industrial associations	11.4 %	1.9 %	86.8 %	4.25
The firm participates in foreign exhibitions and seminars	33.9 %	11.3 %	54.7 %	3.25
The firm builds networks and external relationships with its competitors	47.2 %	18.9 %	34 %	2.58
The firm establishes relationships with its customers and suppliers	9.4 %	3.8 %	86.8 %	3.96
External Linkages	**32.46 %**	**9.82 %**	**57.74 %**	**3.26**

4.5.6 Internal linkages

Table (2.25) exhibits the attitudes of Palestinian plastic firms toward establishing internal linkages, networks, and relationships with within their boundaries.

Table 4.25: Percentages and mean values of internal linkages indicators

The firm's internal linkages	Disagree	Neutral	Agree	Mean Value
The firm makes partnership and communication networks between its managers and the staff	13.2 %	17 %	69.8 %	3.66
The firm's departments managers have good relations with the staff	13.2 %	18.9 %	68 %	3.62
Managers discuss and take into consideration feedback, useful ideas from the board and staff members	30.2 %	24.5 %	45.2 %	3.04
Internal linkages	**18.87 %**	**20.13 %**	**61 %**	**3.4403**

We see that the mean value of the internal linkages is 3.44, which means that Palestinian plastic firms have moderate positive attitudes toward establishing internal linkages and networks between their internal departments, managers, and staff. To explain more, around 70% and 68% of plastic firms have positive attitudes toward establishing

partnerships and communication networks between their managers, or tend to make relationships between the firms' department managers and the staff. Also, the firms' managers moderately discuss and take into consideration: feedback, useful ideas from the board and staff members.

4.5.7 The Firm's Innovative Environment & Culture

Table (4.26) below clarifies the attitudes of Palestinian plastic firms toward creating an innovative environment or culture inside their firms.

Table 4.26: Percentages and mean values of innovative environment indicators

The firm innovative Environment & Culture	Disagree	Neutral	Agree	Mean
The firm rewards its creative employees	22.6 %	11.3 %	66 %	3.58
The firm punishes it low productivity employees	32.1 %	24.5 %	43.4 %	2.8868
The firm encourages its employees toward developing new products	41.5 %	20.8 %	37.7 %	2.74
The firm encourages its employees toward developing new production methods	51 %	15.1 %	33.9 %	2.45
The firm encourages its employees to learn and develop their skills	28.3 %	17 %	54.7 %	3.28
The firm's environment encourages employees to develop new marketing methods	47.2 %	11.3 %	41.5 %	2.55
Environment & Culture	37.12 %	16.67 %	46.2 %	2.92

The Table shows that plastic firms operate in a weak innovative environment. Only about 46% of the firms agreed that their environment or culture encourages their staff toward developing the firm's products and production processes. It is clear that 66% of plastic firms strongly agreed and showed positive attitudes toward rewarding their creative employees. In contrast, plastic firms have a slack environment that lacks encouragement toward developing new production and marketing methods. However, plastic firms have poor attitudes toward encouraging their labor toward learning and developing their staff skills, which contradicts with the last point.

4.5.8 Obstacles to innovate

Table (4.27) on the next page, exhibits the main obstacles to innovation in the Palestinian plastic industry.

The biggest obstacle to innovate is the bad economic situation in Palestine, which has different degrees of influence on different aspects. We see that plastic firms agree that

the economic situation hinders process innovations more than product innovations. Moreover, there is a slight lesser influence on innovation, which comes from the financial situation of the Palestinian plastic firms.

Table 4.27: Percentages and mean values of innovation obstacles

The obstacles and challenges of developing new products and processes	Disagree	Neutral	Agree	Mean
Developing new products is very costly	11.3 %	5.7 %	83.1 %	4.32
Developing production methods or processes is very costly	3.8 %	9.4 %	86.8 %	4.51
The firm suffers from marketing its new products	35.8 %	20.8 %	43.4 %	3.25
The firm cannot develop new marketing methods	41.5 %	15.1 %	43.4 %	3.19
Legal procedures and tax legislation influence the firm's development process	16.9 %	9.4 %	73.6 %	4.08
The economic situation in Palestine influences the development of new products	5.7 %	1.9 %	92.5 %	4.58
The economic situation in Palestine influences the process of developing new production methods	3.8 %	1.9 %	94.3 %	4.62
Under the economic situation in Palestine, your business lacks sufficient budget and finance	7.6 %	5.7 %	86.8 %	4.40

According to the cost issue, it is obvious that process innovation is more costly than product innovation, which does not contradict the interviews and open questions in the questionnaire. This is due to the association with changing the machines that require a huge cost. Another important issue is that the legal procedures and tax legislation form counterproductive factor of the development process. According to the marketing issues, plastic firms suffer from marketing their new products more than developing new marketing methods.

4.5.9 Organizational performance

Table (4.28) explains the organizational performance of Palestinian plastic firms during 2012 – 2014.

Table 4.28: Percentages and mean values of organizational performance indicators

The firm's organizational performance	Disagree	Neutral	Agree	Mean
The firm has good relations with its suppliers of raw or intermediate materials	3.8 %	5.7 %	90.5 %	4.36
The firm has good relations with its distributors	7.6 %	9.4 %	83 %	4.08
Employees enjoy a high degree of adaptation to the firm's environment	11.4 %	17 %	71.7 %	3.85
The firm's staff have high ability to learn	26.4 %	24.5 %	49.1 %	3.19
Organizational performance	**12.3 %**	**14.15%**	**73.58 %**	**3.87**

The Table shows that the firms 'organizational performance have a mean value of 3.88,

which means that plastic firms had slightly improved their organizational performance during 2012 - 2014. To explain more, most of the Palestinian plastic firms had improved their relations with their suppliers of raw or intermediate materials, had good relations with their distributors and their employees enjoyed a high degree of adaptation to the firm's environment. However, the ability to of employees to learn should be improved; this is due the lack of skilled workers and expertise in the plastic industry. In addition to that, most of the workers in the field of plastics industry do not have an academic or university education (Royal, Personal Communication, November 30, 2014).

4.5.10 Competitive advantage

Table (4.29) below demonstrates the changes in the competitive advantage of the Palestinian plastic firms during 2012 – 2014.

Table 4.29: Percentages and mean values of competitive advantage indicators

The firm is better than competitors in relation to:	Disagree	Neutral	Agree	Mean
The speed of response to new customer needs	28.3 %	5.7 %	66 %	3.47
The ability to tailor products/services to individual customer needs	35.8 %	0 %	64.1 %	3.28
The speed in entering new markets	45.3 %	15.1 %	39.6 %	2.64
The rate of introduction of new products/services	50.9 %	15.1 %	34 %	2.58
Competitive advantage	**40.08%**	**8.98 %**	**50.93 %**	**2.9953**

The Table (4.29) shows that the competitive advantage of plastic firms did not improve but decreased slightly during 2012 - 2014. Moreover, the data from Table shows that about 66% of plastic firms are better in responding to the new needs of the customers than their competitors. Also, plastic firms had improved their ability to customize their products and enter new markets. In contrast, plastic firms indicated negative responses toward introducing new products and services into the market during the same period.

4.5.11 Economic Performance

Table (4.30) presents the economic performance of plastic firms during 2012-2014.

Table 4.30: Percentages and mean values of the economic performance indicators

The Economic Performance of the firm:	Disagree	Neutral	Agree	Mean
Had been very profitable	35.9 %	28.3 %	35.9 %	2.85
Had achieved rapid growth	43.4 %	17 %	39.7 %	2.81
Had improved its competitiveness	39.6 %	5.7 %	54.7 %	2.98
Had strengthened its strategic position	28.3 %	7.5 %	64.1 %	3.32
The firm had significantly increased its market share	37.7 %	7.5 %	54.7 %	3.11
Economic Performance	**36.98 %**	**13.2 %**	**49.82 %**	**3.0151**

Table (4.30) shows that the economic performance of plastic firms did not change during 2012-2014. It is clear that Palestinian plastic firms did not grow rapidly, their profitability & competitiveness remained the same, and their market share did not increase significantly. On the other hand, Palestinian plastic firms had strengthened their strategic position during the same period.

4.6 Cross-Tabs Analysis

This section provides detailed descriptive comparisons between innovative and non-innovative firms in terms of characteristics, performance, innovation drivers, and outcomes of innovation.

4.6.1 Market Share, Sales, Profits, & Product Innovation:

Table (4.31) illustrates the change in market share, sales, and profits for product innovative and non-innovative firms between 2012 & 2014.

Table 4.31: market share, sales & profits for product innovative firms

	Product Innovation	Decrease	No Change	Increase
Market Share	No change in the products' shape or characteristics * Market Share	54.6%	18.2%	27.3%
	Increase in the number of changed products in terms of shape and characteristics * Market Share	12%	12%	76%
Sales	No change in the products' shape or characteristics * Sales	63.6%	15.9%	20.4%
	Increase in the number of changed products in terms of shape and characteristics * Sales	20%	12%	68%
Profits	No change in the products' shape or characteristics * Profits	54.5%	13.6%	31.8%
	Increase in the number of changed products in terms of shape and characteristics * Profits	4%	8%	88%

During 2012-2014, about 27% of the firms that did not adopt product innovations on its products had increased their market share. However, there was a huge difference for the firms that adopted product innovations where 76% of these firms had increased their market share; firms that adopted product innovations had witnessed a lesser decrease and much more increase in market share, sales, and profits.

According to the sales, about 32% of the firms that did not adopt product innovations had increased their sales while there was a huge difference for the firms that adopted product innovations where 88% of these firms had increased their sales.

For Profits, only 20.4% of the firms that did not adopt product innovations on their products had increased their profits. On the other hand, there was a huge difference for the firms that adopted product innovations where 68% of those firms had increased their profits.

Hence, during 2012-2014, firms that performed product innovations had a much more increase and fewer declines in terms of market share, sales, and profits.

4.6.2 Exports, Number of External Markets & Product Innovation

Table (4.32) illustrates the change in exports and the number of external markets for product innovative firms between 2012 & 2014.

Table 4.32: Exports & the number of external markets for product innovative firms

	Product Innovation	Don't Export	Decrease	No Change	Increase
Exports	No change in the products' shape or characteristics * Exports	25%	31.8%	15.9%	27.3%
	Increase in the number of changed products in terms of shape and characteristics * Exports	16%	4%	36%	44%
Number of external markets	No change in the products' shape or characteristics * Number of External Markets	25%	13.6%	59.1%	2.3%
	Increase in the number of changed products in terms of shape and characteristics * Number of External Markets	16%	0%	68%	16%

Moreover, only 27% of the firms that did not perform product innovations on their products had increased their exports or sales to external markets. On the other hand, there was a slight difference for the firms that performed product innovations where 44% of those firms had increased their exports during the same period.

For the number of external or exporting markets, only 2.3% of the firms that did not perform product innovations on their existing products had increased their export destinations. On contrast, there was a difference for the firms that perform product innovations where 16% of those firms had increased their number of export destinations during the same period.

Hence, product innovative firms are more likely to export because product innovation increased the exports and the number of external markets; firms that performed product innovations had witnessed a lesser decrease and much more increase in their exports and the number of external markets than non-product innovative ones.

4.6.3 Product Innovation & the Number of products produced & process innovations

Table (4.33) on the next page, illustrates the cross-tabs between product innovations, the number of products and process innovations.

Table 4.33: cross-tabs between product innovations, the number of products & process innovations

	Number of products		Process innovation	
Product Innovation	**No Change**	**Increase**	**No Change**	**Increase**
No change in the products' shape or characteristics	79.5%	20.5%	97.7%	2.3%
Increase in the number of changed products in terms of shape and characteristics	8.3%	91.7%	64.0%	36.0%

*Source of data: calculated by the researcher

Only about 21% of the firms that did not adopt product innovations on their products had increased the number of their products produced for each product line. On the other hand, about 92% of product innovative firms had increased their number of products for each product line. Hence, firms that adopted product innovations have experienced a much more increase in the number of products than non-product innovative ones.

Concerning process innovations, only 2.3% of the non-product innovative firms had changed their production processes during the last three years while about 36% of product innovative firms had already changed their production methods or procedures (process innovation) during the same period. Hence, firms that adopted product innovations had a greater chance to perform process innovations.

4.6.4 Market Share, Sales, Profits and Process Innovations

Table (4.34) on the next page, illustrates the change in market share, sales, and profits for process innovative firms between 2012& 2014.

At least 60% of the firms that adopted new production methods had increased their market share, sales, and profits. However, less than 45% of the firms that did not change their production methods had witnessed an increase in their market share, sales and profits.

Table 4.34: market share sales & profits for process innovative firms

	Process Innovation	Decrease	No Change	Increase
Market Share	No change in the production processes * Market Share	44.1%	16.9%	39%
	Increase in the number of change or new production processes * Market Share	10%	10%	80%
Sales	No change in the production processes * Sales	40.7%	13.6%	45.8%
	Increase in the number of change or new production processes * Sales	10%	0%	60%
Profits	No change in the production processes * Profits	50.8%	16.9%	32.2%
	Increase in the number of change or new production processes * Profits	30%	0%	70%

*Source of data: calculated by the researcher

Hence, process innovation increased the market share, sales, and profits of the firms; firms that performed process innovations had witnessed a lesser decline and a much more incline in their market share, sales and profits than non-process innovative.

4.6.5 Exports, Number of external markets & Process Innovation

Table (4.35) illustrates the cross-tabs between process innovations, exports and the number of external markets.

Table 4.35: cross-tabs between process innovations, exports & the number of external markets

	Process Innovation	Don't Export	Decrease	No Change	Increase
Exports	No **change in the** production processes * Exports	23.7%	25.5%	18.6%	32.2%
	Increase in the number of change or new production processes * Exports	10%	0%	50%	40%
Number of external markets	No change in the production processes * Number of external markets	23.7%	10.2%	62.7%	3.4%
	Increase in the number of change or new production processes * number of external markets	10%	0%	60%	30%

*Source of data: calculated by the researcher

According to the exports, about 76% of the firms that did not perform process innovations had exported or sold their products to external markets while 90% of the firms that performed process innovations indicated that they had exported or sold their products to external markets during 2012-2014. Moreover, only about 32% of the firms that did not perform process innovations had increased their exports to external markets. On the other hand, there was a slight difference for the firms that performed process innovations where 40% of these firms had gradually increased their exports during the

same period.

According to the number of external markets, only 3.4% of the firms that did not perform process innovations had increased the number of external markets. However, there was a significant difference for the firms that performed process innovations where 30% of those firms had gradually increased their number of export destinations. Hence, firms that performed process innovations are more likely to export, and to increase the number of export destinations than non-process innovative firms.

4.6.6 Process innovations, number of products produced & product innovations

Table (4.36) illustrates the cross-tabs between process innovations, the number of products and product innovations.

Table 4.36: cross-tabs between process innovations, the number of products & product innovations

	Number of products		Product innovation	
Process Innovation	**No Change**	**Increase**	**No Change**	**Increase**
No change in the production processes * Exports	63.8%	36.2%	72.9%	27.1%
Change in the production processes for existing products * Exports	0.0%	100.0%	10.0%	90.0%

*Source of data: calculated by the researcher

With relation to the firms that did not perform process innovations on their products, only 36% of these firms had increased the number of their products produced for each product line. On the other hand, all the firms that changed their production processes had increased the number of products for each product line. Hence, firms that performed process innovations had experienced a much more increase in the number of products than non-process innovative firms.

During the past three years, about 27% of the firms that did not change their production processes had changed their products' shape or physical characteristics. However, about 90% of the firms that already changed their production methods or procedures (process innovation) had changed their products' shape or physical characteristics (product innovation). Hence, firms that performed process innovations had a greater chance of adopting product innovations than non-process innovative firms.

As previously included, changing the physical characteristics of the product is associated with changing the production processes or methods. This can be attributed to the fact that changing the production methods or processes requires a parallel change or upgrade of existing machines and equipment.

4.7 Comparisons

4.7.1 Determinants of product & process innovations

Table (4.37) provides a comparison of the means values between the firm's characteristics, performance, the drivers of innovation, and outcomes of product & process innovations.

Table 4.37: a caparison between the mean values of firms' characteristics and innovation drivers in relation to product and process innovation

		Age	**Cost of Machines**	**Size**	**Creativity**	**Internal Knowledge**	**External Knowledge**	**External Linkages**	**Internal Link-ages**	**Environment**
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Pd	No Change	17	380,509	20	2.58	3.32	2.00	3.09	3.34	2.71
	Increase	19	438,667	80	3.58	3.72	2.79	3.62	3.76	3.37
Ps	No Change	17	351,141	20	2.70	3.34	2.12	3.21	3.41	2.79
	Increase	20	1,030,000	190	4.00	3.88	3.00	3.63	3.86	3.76

* Source of data: calculated by the researcher.

Table (4.37) shows that firms that performed product innovation (changing the products' shape or physical characteristics) had are older in average than non-product innovative firms, and firms that performed process innovation (changing the production methods) are older on average than non-process innovative firms. Moreover, process innovative firms are older on average than product innovative firms.

According to the firms' size in terms of the number of labor, there is a huge difference between the average size of innovative and non-innovative firms where process innovative firms are much bigger in size than product innovative firms.

For the cost of working machine, the results showed a difference between innovative and non-innovative firms. On one hand, firms that increased their number of changed products in terms of shape or characteristics own more machines or more costly machines than ordinary firms. On the other hand, there is a wide difference in the average cost of machines between process innovative firms and ordinary firms. Therefore, it is clear that product and process innovative firms own more machines and more advanced machines than non-innovative firms. Moreover, there is a huge difference in the cost of

machines between product and process innovative firms, because changing the production processes requires more advanced machines and technology than traditional production procedures, which are more costly than traditional or older machines.

From the Table, it is clear that innovative firms are more willing to be creative than non-innovate firms. On one hand, innovative firms have positive attitudes toward using creativity elements within the firm's boundaries while non-innovate firms innovative firms have weak interests towards applying creativity tools. On the other hand, it appears that process innovative firms have more attitudes toward creativity than product innovative firms.

According to the internal knowledge, innovative firms have more willingness to utilize these sources of internal knowledge than non-innovate firms, where this willingness is slightly stronger for process innovative firms. Moreover, the poor attitudes toward employing the external sources of knowledge for plastic firms in general. The Table also shows that non-product innovative firms have fewer attitudes (or more negative attitudes) toward exploiting the external sources of knowledge than product innovative firms. On the other hand, the Table shows that process innovative firms have moderate attitudes toward employing the external sources of knowledge in the production processes.

Moreover, the Table shows that non-innovative firms have moderate attitudes toward establishing external linkages and relationships outside the firms' boundaries whereas product and process innovative firms have more positive attitudes toward establishing external linkages. Moreover, there is a slight difference in the attitudes between innovative and non-innovative firms, where these attitudes are stronger for process innovative firms. Hence, firms that performed innovations have a stronger positive willingness to use the sources of internal linkages within their boundaries than non-innovative ones.

Also, it is obvious from the Table that innovative firms had a more innovative environment and culture than non-innovate firms where process innovative firms showed more positive attitudes toward this point.

To summarize, in general, there is a distinct discrepancy between the mean values of innovation drivers for the innovative and non-innovative firm. The results indicate that the attitudes toward innovation drivers are stronger for process innovative firms than product innovate ones.

4.7.2 Comparing mean values of employment, performance, and the competitive advantage with respect to the change in product and process innovations.

Table (4.38) provides comparisons across the means values of innovative and non-innovative firms in terms of employment, organizational performance, competitive advantage, and the firm's economic performance.

Table 4.38: a caparison between the mean the values of innovative and non-innovative firms in terms of employment, organizational performance, competitive advantage and the firm's performance

		Product Innovation			Process Innovation		
		No Change	Decrease	Increase	No Change	Decrease	Increase
Number of working machines in 2012	Mean	9	.	14	10	.	21
Number of working machines in 2013	Mean	9	.	17	11	.	24
Number of working machines in 2014	Mean	10	.	21	12	.	28
Organizational Performance	Mean	3.65	.	4.40	3.76	.	4.68
Economic Performance	Mean	2.63	.	4.05	2.94	.	3.77
Competitive Advantage	Mean	2.64	.	3.86	2.89	.	3.89

* Source of data: calculated by the researcher.

The Table shows that innovation had a positive impact on the employment during 2012 - 2014. On one hand, innovative firms have an average number of workers more than non-innovative firms. On the other hand, firms that have changed their production methods (process innovations) have increased the number or their employees much more than firms that changed their products shape or physical characteristics.

Moreover, innovative firms had improved their overall performance more than non-innovative firms. To explain more, process innovative firms have better improvements in their organizational performance than product innovative firms. However, product innovative firms had better improvements in their economic performance than process innovative firms.

This result comports with the main goal of innovation that is to achieve a competitive advantage. Moreover, the Table reveals that on average innovative firms had achieved competitive advantage better than non-innovative firms. In addition, it shows that process innovative firms had slightly more improvements in competitive advantage than product innovative firms.

4.8 One-way ANOVA t-test

4.8.1 Firm's Characteristics and Drivers of Innovation

Using the one-way ANOVA t-test to analyze the variance of product innovation by its drivers, the results of the test are shown in Table (4.39).

Table 4.39: One-way Analysis of Variance of Product Innovation by innovation determinants

	Product Innovation		**Process Innovation**	
	F	**Sig.**	**F**	**Sig.**
Age	.953	.554	.994	.512
Cost of Machines	.930	.583	1.041	.487
Size	2.444	.013	2.907	.004
Creativity	6.047	.000	3.575	.001
Internal Knowledge	2.584	.008	3.698	.000
External Knowledge	2.562	.009	3.239	.002
External Linkages	2.405	.014	3.008	.003
Internal Linkages	3.307	.003	4.158	.000
Environment (Culture)	1.670	.097	1.851	.06

* Source of data: calculated by the researcher.

According to the difference between innovative and non-innovative firms in term of their characteristics, the one-way ANOVA t-test indicates that there is no difference between innovative and non-innovative firms in terms of age and working machine, which means that firms can innovate regardless of their age and cost of working machines. On the other hand, there is a difference between innovative and non-innovative firms in terms of size (measured by the number of labor in the last year). That means innovative firms are bigger in size than non-innovative firms. Nevertheless, it is clear that this difference is more distinct and significant for process innovative firms, which means that the size of the firms is an important factor to perform process innovations, but this is not true for product innovations. Concerning innovation drivers, the one-way ANOVA t-test shows that there is a significant difference between innovative and non-innovative firms in terms of creativity, knowledge, and linkages. That means, innovative firms are more creative, have better or more internal and external linkages with different parties, and uses the sources of internal and external knowledge than non-innovative firms. Moreover, it is obvious that these differences are more significant for process innovations rather than product innovations with bigger F-values and lower p-values.

On contrast, the results of this test showed that there is insignificant difference (close to significant) between innovative and non-innovative firms in terms of their environment of culture, and there is no difference between product and process innovative firms in terms of age and the cost of machines. That means, age and cost of machines do not determine the type of innovation that firms can perform.

4.8.2 The Outcomes of Product Innovation

Using the one-way ANOVA t-test to analyze the variance of the outcomes of innovation in terms of product and process innovation, the results of the test are shown in Table (4.40). The one-way ANOVA t-test shows that innovative firms had experienced improvements in their performance and competitive advantage. That means, product and process innovative firms have improved their performance and achieved competitive advantage better than non-innovative firms. In contrast, the test did not show any difference between innovative and non-innovative firms in terms of labor during 2012 – 2014.

Table 4.40: ONE-WAY Performance, Competitive Advantage & Employment by Product & Process Innovation

	Product Innovation		**Process Innovation**	
	F	Sig.	F	Sig.
Organizational Performance	3.384	.002	3.239	.002
Economic Performance	10.640	.000	3.445	.001
Competitive Advantage	10.640	.000	4.826	.000
Employment	1.208	.312	.758	.718

* Source of data: calculated by the researcher.

2.2 Correlation analysis

4.8.1 Creativity & Innovation

Table (4.41) on the next page, shows the correlation matrix between innovation indicators and creativity indicators.

The empirical results indicate that there is a mutual and positive relationship between creativity and innovation. The coefficient correlation between product innovation

indicators and creativity indicators shows that there is a positive relationship between product innovation and creativity. There is a positive relationship between employing new ideas inside the firm and the continual production of new products, producing new products according to the market needs, and adjusting the products' design in order to enter new markets. That means that there is a positive relationship between creativity and product innovation. Thus, increasing the generation of novel ideas inside the firm contributes positively to produce new products. To explain more, employing new and novel ideas related to the production of new products or the changing of existing products' shape helps the firm to produce new products that could achieve the market needs.

Table 4.41: Correlation between innovation and creativity indicators

	The interest in producing new products that others didn't produce	The continuous developing of products in terms of shape	The continuous improvements of production processes to reduce the cost	The interest in using new methods to reduce the cost	Steering employees toward developing new products or ideas	Steering employees toward developing new production methods
Pd: continuous production of new products	.538 .000 53	.452 .001 53	.474 .000 53	.554 .000 53	.458 .001 53	.550 .000 53
Pd: quick production of new products according to the market	.689 .000 53	.565 .000 53	.314 .022 53	.525 .000 53	.571 .000 53	.478 .000 53
Pd: continuous adjustments of products design	.748 .000 53	.602 .000 53	.380 .005 53	.557 .000 53	.519 .000 53	.586 .000 53
Ps: developing production processes	.569 .000 53	.437 .001 53	.361 .008 53	.562 .000 53	.672 .000 53	.680 .000 53
Ps: Improving production processes	.491 .000 53	.446 .001 53	.395 .003 53	.570 .000 53	.763 .000 53	.709 .000 53
Ps: using new mechanisms at work to reduce the cost	.407 .003 53	.293 .033 53	.414 .002 53	.482 .000 53	.354 .009 53	.439 .001 53
Ps: using the modern technology	.480 .000 53	.282 .041 53	.310 .024 53	.417 .002 53	.443 .001 53	.422 .002 53

*Pd: Product innovation. Ps:Process Innovation MI: Marketing Innovation OI: Organizational innovation

Concerning process innovation, there is a positive relationship between employing new ideas inside the firm and developing or improving the production processes, reducing

the production costs through adopting new production process and using advanced technology in the production process. Employing novel or creative ideas that related to changing or improving the existing production processes inside the firm could decrease the production costs. Consequently, these creative ideas significantly contribute to changing the production processes inside the firm, which could lead to a better market position through reducing the unit cost. Hence, it is clear that innovative firms are more likely to employ novel ideas to improve their products or production processes. Thus, increasing the generation of novel ideas inside the firms increases the chance for performing process innovation.

4.8.2 Internal knowledge & innovation

Table (4.42) displays the correlation matrix between innovation indicators and internal knowledge indicators.

Table 4.42: correlations between Innovation and internal knowledge indicators

	The firm is concerned about the research and development (R&D)	Conducting development and testing on the products	Conducting development and testing on the production processes	The interest in training the staff	The interest in enhancing the staff to acquire skills	The interest in using sophisticated machinery and software	The interest in exchanging information and experience
Pd: continuous production of new products	.484 .000 53	.346 .011 53	.268 .052 53	-.002 .990 53	.235 .090 53	.483 .000 53	.501 .000 53
Pd: quick production of new products according to the market	.527 .000 53	.410 .002 53	.361 .008 53	.171 .220 53	.382 .005 53	.426 .001 53	.463 .000 53
Pd: continuous adjustments of products design	.586 .000 53	.386 .004 53	.451 .001 53	.197 .157 53	.356 .009 53	.460 .001 53	.393 .004 53
Ps: developing production processes	.477 .000 53	.249 .072 53	.229 .099 53	.070 .616 53	.383 .005 53	.654 .000 53	.637 .000 53
Ps: Improving production processes	.457 .001 53	.255 .065 53	.300 .029 53	.103 .461 53	.447 .001 53	.612 .000 53	.711 .000 53
Ps: using new mechanisms at work to reduce the cost	.533 .000 53	.267 .053 53	.333 .015 53	.268 .053 53	.380 .005 53	.383 .005 53	.278 .044 53
Ps: using the modern technology	.513 .000 53	.355 .009 53	.331 .015 53	.168 .228 53	.379 .005 53	.705 .000 53	.398 .003 53

It is clear that there is a weak and positive mutual relationship between the usage of internal sources of knowledge and product innovation. The correlation matrix shows that there is an insignificant relationship between product innovation indicators and the internal training of the staff. On the other hand, there is a significant weak positive relationship between the indicators of product innovation and performing R&D, testing the products and processes, enhancing the staff skills, using sophisticated machinery or software and exchanging information or experience among the staff. In addition, it is clear that R&D have the strongest relationship with product innovation indicators. Thus, performing R&D activities inside the firms could contribute positively to produce new products or to develop existing products in terms of shape or characteristics. In addition, exchanging the firm's knowledge among its departments or the staff allows it to improve its products. In addition, using sophisticated machinery and software inside the firm allows it to penetrate new markets through adjusting its products design.

In relation to process innovation indicators, there is a mutual positive relationship between the indicators of process innovation and performing R&D, testing the products and processes, enhancing the staff skills, using sophisticated machinery or software and exchanging information and experience among the staff. On the other hand, the correlation matrix shows that there is an insignificant relationship between process innovation indicators and training the staff. To explain more, employing advanced machines and exchanging the firm's knowledge among the staff are the strongest indicators in order to develop and improve the existing production processes inside the firm. However, performing R&D inside the firm and using advanced machines induces the firm to use advanced and less costly production processes that allow it to produce with more efficiency and with lower costs. Consequently, this point helps the firm to differentiate its products in the market in terms of quality and cost.

4.8.3 External knowledge & innovation

Table (4.43) on the next page, displays the correlation matrix between innovation indicators and external knowledge indicators.

Table 4.43: correlations between innovation and external knowledge indicators

	Interaction with customers in order to improve its products	The firm contacts its customers in order to get feedback	The firm is concerned in making use of research results	The interest in purchasing and acquiring technical information to develop the products	The interest in purchasing and acquiring technical information to develop the production process	purchasing technical information that is needed to develop the methods of production	The interest in training the staff abroad	The interest in sending employees to various local and abroad seminars, workshops, and conferences
Pd: continuous production of new products	.502 .000 53	.462 .000 53	.519 .000 53	.334 .014 53	.477 .000 53	.423 .002 53	.369 .007 53	.542 .000 53
Pd: quick production of new products according to the market	.450 .001 53	.466 .000 53	.493 .000 53	.258 .062 53	.268 .052 53	.288 .036 53	.403 .003 53	.544 .000 53
Pd: continuous adjustments of products design	.316 .021 53	.403 .003 53	.438 .001 53	.397 .003 53	.245 .077 53	.273 .048 53	.476 .000 53	.649 .000 53
Ps: developing production processes	.569 .000 53	.607 .000 53	.590 .000 53	.416 .002 53	.472 .000 53	.427 .001 53	.297 .031 53	.476 .000 53
Ps: Improving production processes	.559 .000 53	.624 .000 53	.520 .000 53	.475 .000 53	.465 .000 53	.422 .002 53	.275 .046 53	.456 .001 53
Ps: using new mechanisms at work to reduce the cost	.372 .006 53	.604 .000 53	.501 .000 53	.405 .003 53	.242 .081 53	.319 .020 53	.080 .567 53	.230 .098 53
Ps: using the modern technology	.262 .058 53	.266 .055 53	.371 .006 53	.291 .034 53	.246 .075 53	.333 .015 53	.258 .062 53	.364 .007 53

The empirical results indicate that there is a mutual and positive relationship between the indicators of product innovation and the indicators of external knowledge. The matrix shows that external knowledge gained from seminars, workshops and conferences have a positive relationship with product innovation because these sources equip the firm with new knowledge that could be translated into innovations. In addition, the empirical results indicate that when firms interact with their customers, this will

provide them with the necessary knowledge about how to improve their products. In addition, making use of external research results and participating in seminars, workshops, and conferences equip the firm with new knowledge that is necessary to produce new products. Consequently, this external knowledge allows the firm to produce new products that could meet the market needs. The results also indicate that participating in seminars, workshops, and conferences and training the staff provides the firm with necessary knowledge that is useful to adjust the design of existing products in order to enter new markets. As well, holding workshops outside the firm with experts and scholars will benefit to develop the plastic industry.

Concerning process innovation, there is a mutual and positive relationship between the indicators of process innovation and the indicators of external knowledge. The empirical results indicate that knowledge acquired through the interaction with customers and knowledge gained from the results of the external research could contribute positively to develop and improve the firm's existing production processes. Moreover, besides the interaction with customers and making use of external research results, the empirical results indicate that acquiring technical information motivates firms to use new production mechanisms at work to reduce the production costs. Moreover, firms that are interested in using the modern technological production process are more oriented toward exploiting the research results, and participating in seminars, workshops, and conferences.

4.8.4 External linkages & innovation

Table (4.44) on the next page, displays the correlation matrix between innovation indicators and external linkages indicators.

The empirical results indicate that there is a weak significant positive relationship between the indicators of product innovation and the indicators of external linkages. The matrix shows that the collaboration with other companies, universities, or scientific research institutions has a significant relationship with producing new products. Moreover, there is an insignificant relationship between the membership in commercial, scientific organizations, chambers of commerce, or industrial associations and producing new products. Nevertheless, firms that participate in foreign exhibitions and establish ties with competitors are more likely to produce new products continuously

and to use the modern technology in their production. In addition, firms could achieve the market requirements through establishing ties with stakeholders and participating in foreign exhibitions or seminars that allow them to produce new products for the market. In addition, participating in exhibitions and establishing ties with competitors, customers, and suppliers allow firms adjust their products' design continuously.

Table 4.44: correlations between innovation and external linkages indicators

	collaborating with other companies, universities or scientific research institutions	membership in commercial and scientific organizations, chambers of commerce or industrial associations	participating in foreign exhibitions and seminars	Building networks and external relationships with competitors	establishing relationships with customers and suppliers
Pd: continuous production of new products	.152 .278	.170 .223	.351 .010	.323 .018	.318 .020
Pd: quick production of new products according to the market	.077 .582	.256 .065	.384 .005	.303 .028	.433 .001
Pd: continuous adjustments of products design	.294 .033	.265 .055	.397 .003	.387 .004	.406 .003
Ps: developing production processes	.043 .757	.308 .025	.416 .002	.334 .015	.259 .061
Ps: Improving production processes	.112 .425	.348 .011	.374 .006	.241 .083	.362 .008
Ps: using new mechanisms at work to reduce the cost	.051 .717	.368 .007	.471 .000	.257 .063	.314 .022
Ps: using the modern technology	.236 .089	.288 .036	.344 .012	.370 .006	.305 .026

Concerning process innovation, in general, there is a weak significant positive relationship between the indicators of process innovation and the indicators of external linkages. However, the matrix shows that collaborations with companies, universities, or scientific research institutions have no significant relationship with all process innovation indicators. In addition to that, building networks and external relationships with competitors have no significant relationship with improving the production methods and using new mechanisms at work in order to reduce the production cost. On the other hand, it is clear that the participation in foreign exhibitions and seminars has the strongest positive relationship with process innovation. In other words, when firms participate in foreign exhibitions and seminars, they will be more motivated to develop their existing production methods. Moreover, firms that are interested in developing their

production methods are more willing to establish relationships with their competitors. In addition, firms with interests in improving their production processes are more willing to participate in foreign exhibitions and to establish ties with competitors. Concerning the membership in organizations and participating in foreign exhibitions, it helps firms to use less costly production processes. In addition, when firms participate in foreign exhibitions and establish ties with competitors, they will be more interested in using the modern technology in their production processes. In other words, this kind of ties forms an indirect channel for necessary knowledge that leads to innovations.

4.8.5 Internal linkages & innovation

Table (4.45) displays the correlation matrix between innovation indicators and internal linkages indicators.

Table: 4.45 correlations between innovation and internal linkages indicators

	The firm makes partnership and communication networks between its managers and the staff	The firm's departments managers have good relations with the firm's staff	Managers discuss and take into consideration: feedback, useful ideas from the board and staff members
Pd: continuous production of new products	.229 .099	.232 .095	.462 .000
Pd: quick production of new products according to the market	.507 .000	.496 .000	.505 .000
Pd: continuous adjustments of products design	.371 .006	.431 .001	.637 .000
Ps: developing production processes	.274 .047	.363 .008	.664 .000
Ps: Improving production processes	.288 .037	.415 .002	.600 .000
Ps: using new mechanisms at work to reduce the cost	.350 .010	.428 .001	.591 .000
Ps: using the modern technology	.363 .007	.411 .002	.554 .000

In general, there is a significant moderate and positive relationship between the indicators of internal knowledge and product innovation. On the other hand, there is an insignificant relationship between producing new products and establishing internal ties between managers and departments. It is clear that internal linkages have the strongest positive relationship with producing new products according to the market requirements. Moreover, manager's discussions with the staff have the strongest positive relationship with the adjustments of product's design in order to enter new markets. In other words,

this indicates that when firms discuss and take into consideration feedback, useful ideas from the board and staff members they will be more interested in performing product innovation through producing new products or changing the design of their new products. In addition, when firms make partnership and communication networks between their managers and the staff, they will be more interested in responding to the market needs through producing new products. In addition, this also makes the firm more interested in performing process innovations.

Concerning process innovation, there is also a positive and significant mutual relationship between the indicators of process innovation and the internal linkages. The empirical results indicate that when firms discuss and take into consideration feedback, useful ideas from the board and staff members, they will be more motivated toward performing process innovations. This indicates that this indicator of internal knowledge is the most important thing that contributes positively to perform process innovations inside the Palestinian plastic firms.

4.8.6 Innovative environment & innovation

Table (4.46) on the next page, displays the correlation matrix between innovation indicators and innovative environment indicators.

The empirical results indicate that there is a significant, positive, but weak relationship between product innovation indicators and innovative environment indicators except the rewarding and punishment systems. However, it appears that there is a significant and weak positive relationship between the rewarding system and the continuous adjustments of products design. In other words, encouraging the staff to develop new production and marketing methods contributes to continuously producing new products. In addition, when the firm's environment encourages its staff to develop new products and to learn or develop their skills, this will allow the firm to respond quickly to the market by producing new products to meet the market needs. Moreover, the environment that encourages its staff to develop new products and new production processes is more likely to contribute to adjusting or changing the design of the firm's existing products in order to penetrate new markets.

On the other hand, there is a significant moderate relationship between the indicators of process innovation and the innovative environment except the punishment system. The

matrix also shows that innovative environment has the strongest relationship with improving and developing the production processes than other indicators of process innovations. In addition, there is a strong relationship between the encouragements of employees to develop new production methods and to improve or develop new production processes, which mean that this kind of encouragement inside the firm's environment is important to perform process innovations in a form of developments and improvements of existing processes.

Table 4.46: Correlations between innovation and innovative environment indicators

	The firm rewards its creative employees	The firm punishes its low productivity employees	The firm encourages its employees to develop new products	The firm encourages its employees to develop new production methods	The firm encourages its employees to learn and develop their skills	The firm's environment encourages employees to develop new marketing methods
Pd: continuous production of new products	.214 **.124**	.007 **.962**	.327 .017	.378 .005	.303 .027	.345 .011
Pd: quick production of new products according to the market	.223 **.108**	.117 **.404**	.490 .000	.405 .003	.495 .000	.339 .013
Pd: continuous adjustments of products design	.364 .007	-.002 **.990**	.482 .000	.484 .000	.389 .004	.360 .008
Ps: developing production processes	.385 .004	.055 **.697**	.535 .000	.598 .000	.526 .000	.488 .000
Ps: Improving production processes	.362 .008	.089 **.528**	.488 .000	.610 .000	.542 .000	.513 .000
Ps: using new mechanisms at work to reduce the cost	.471 .000	.028 **.840**	.323 .018	.291 .035	.466 .000	.377 .005
Ps: using the modern technology	.337 .014	.279 .043	.380 .005	.304 .027	.319 .020	.319 .020

In other words, Palestinian plastic firms are more likely to develop their production processes when their environment encourages the staff to develop new products or process and to develop their skills besides improving their learning ability. Moreover, encouraging the staff to develop new production processes and to improve their skills allow firms to improve their existing production processes.

When the environment rewards it creative employees and encourages them to develop their working skills, firms will be more interested in using modern technology and new mechanism in order to reduce the production costs. Consequently, this could allow firms to produce with more quality or lower cost. Thus, innovative environment indicators, in

general, have a stronger positive relationship with process innovation indicators than product innovation indicators. Consequently, this means that innovative environment contributes to process innovations more than product innovation because it is associated with the production processes inside the firms.

4.8.7 Obstacles to innovate & innovation

Table (4.47) displays the correlation matrix between innovation indicators and the obstacles to innovate.

Table 4.47: correlations between innovation and obstacles

	Developing new products is very costly	Developing production methods or processes is very costly	The firm suffers from marketing its new products.	The firm suffers from developing new marketing methods	Legal procedures and tax legislations influence the development process	The economic situation in Palestine influences the development of new products	The economic situation influences the process of developing new production methods	The business lacks sufficient budget and finance
Pd: continuous production of new products	-.260 **.060**	-.278 .044	-.193 **.166**	-.245 **.076**	.017 **.903**	-.003 **.985**	.065 **.644**	.028 **.841**
Pd: quick production of new products according to the market	-.366 .007	-.232 **.094**	-.341 .013	-.287 .037	-.033 **.815**	.200 **.151**	.288 .037	.150 **.282**
Pd: continuous adjustments of products design	-.116 **.410**	-.019 **.890**	-.405 .003	-.361 .008	-.204 **.142**	-.059 **.673**	.006 **.966**	.147 **.294**
Ps: developing production processes	-.321 .019	-.353 .010	-.311 .023	-.333 .015	-.122 **.385**	.088 **.529**	.068 **.626**	-.037 **.792**
Ps: Improving production processes	-.220 **.113**	-.267 **.053**	-.364 .007	-.359 .008	-.149 **.287**	.137 **.327**	.120 **.392**	.103 **.462**
Ps: using new mechanisms at work to reduce the cost	-.044 **.756**	-.080 **.571**	-.249 **.072**	-.265 **.055**	-.170 **.224**	.038 **.787**	.061 **.663**	.100 **.476**
Ps: using the modern technology	-.180 **.197**	-.200 **.150**	-.383 .005	-.428 .001	-.157 **.261**	.183 **.188**	.165 **.238**	.021 **.880**

In general, the empirical results indicate that there is a negative relationship between

innovation obstacles and innovation indicators. Concerning product innovation, the correlation matrix shows that the cost of developing new production processes have a significant negative relationship with the continuous production of new products. This could be attributed to the fact that, producing new products is associated with changing the production processes that require bulk costs. It also appears that the high cost of developing new products and the obstacles in marketing have a significant negative relationship with producing new products according to the market requirements. In other words, this means that marketing problems negatively contribute to producing products that are associated with the market. In addition, these marketing obstacles also have a significant negative relationship with adjusting the design of products that are associated with the market.

Concerning process innovation, the empirical results indicate that the macroeconomic obstacles have an insignificant relationship with process innovation indicators. On the other hand, some microeconomic obstacles have a negative relationship with some process innovation indicators. This means that firms do not perform process innovation due to some issues that related to the internal situation of the firm rather than the external or macroeconomic factors.

4.8.8 Innovation & Organizational Performance

Table (4.48) on the next page, displays the correlation matrix between innovation indicators and the organizational performance indicators.

There is a mutual relationship between the organizational performance and innovation. The empirical results indicate that plastic firms in the West Bank that are interested in producing new or improved their products enjoy good relationships with their suppliers of raw or intermediate materials. Moreover, firms that have good relations with their suppliers and their staff and more adaptable to the firm's environment are more interested in continuously producing new products to meet the market needs and to change their products design in order to enter new markets. In other words, this means that product innovation has a positive impact on the organizational performance of the firms. In addition, there is a positive relationship between the indicators of process innovation and the indicators of organizational performance of the firms. The empirical

results indicate that firms with interests in developing their production processes and using modern technology in production had enjoyed a high a high degree of adaptation to the firm's environment and established good relations with their suppliers. Moreover, firms that developed their production processes enjoyed good relationships with their suppliers and distributors. Furthermore, firms that are interested in reducing their production cost through adopting new mechanisms at work enjoy a high degree of adaptation to the firm environment and have good relations with their distributors.

The matrix also shows that process innovation indicators have the strongest positive relationship with organizational performance indicators than product innovation indicators. Thus, process innovation has more impact on the organizational performance than product innovation.

Table: 4.48: organizational performance & innovation

	The firm has good relations with its suppliers of raw or intermediate materials	The firm has good relations with its products distributors	Employees enjoy a high degree of adaptation to the firm environment	The firm's staff have high ability to learn
Pd: continuous production of new products	.478 .000	.344 .012	.318 .020	.180 .197
Pd: quick production of new products according to the market	.577 .000	.499 .000	.515 .000	.338 .013
Pd: continuous adjustments of products design	.499 .000	.344 .012	.526 .000	.267 .053
Ps: developing production processes	.523 .000	.452 .001	.499 .000	.377 .005
Ps: Improving production processes	.482 .000	.470 .000	.466 .000	.408 .002
Ps: using new mechanisms at work to reduce the cost	.331 .015	.571 .000	.438 .001	.195 .163
Ps: using the modern technology	.393 .004	.375 .006	.473 .000	.160 .252

4.8.9 Innovation & Economic Performance

Table (4.49) on the next page, displays the correlation matrix between innovation indicators and the economic performance indicators.

The matrix shows that product innovation indicators have significant and moderate positive relationships with economic performance indicators. The empirical results indicate that firms, which are interested in the continuous production of new products, were very profitable and achieved rapid growth during 2012 – 2014. Moreover, firms

that are interested in the quick production of new products to meet the market requirements were very profiTable and significantly increased their market share. Furthermore, firms with interests in adjusting the design of their products in order to enter new markets had achieved a rapid growth and strengthened their strategic position in the market.

Table: 4.49: economic performance & innovation

	The firm was very profiTable	The firm had achieved rapid growth	The firm had improved its competitiveness	The firm had strengthened its strategic position	The firm had significantly increased its market share
Pd: continuous production of new products	.643 .000	.638 .000	.548 .000	.536 .000	.531 .000
Pd: quick production of new products according to the market	.702 .000	.649 .000	.615 .000	.615 .000	.712 .000
Pd: continuous adjustments of products design	.617 .000	.656 .000	.584 .000	.633 .000	.557 .000
Ps: developing production processes	.545 .000	.519 .000	.658 .000	.641 .000	.591 .000
Ps: Improving production processes	.548 .000	.471 .000	.555 .000	.506 .000	.485 .000
Ps: using new mechanisms at work to reduce the cost	.374 .006	.367 .007	.444 .001	.551 .000	.384 .005
Ps: using the modern technology	.563 .000	.482 .000	.646 .000	.623 .000	.566 .000

In addition to product innovation, it is clear from the matrix that process innovation indicators also have significant and moderate positive relationships with the economic performance indicators. The empirical results indicate that firms with interests in using new mechanisms or modern technology besides developing their production processes had improved their competitiveness and strengthened their strategic position. Moreover, firms that are interested in improving their production processes were very profiTable and improved their competitiveness. In other words, this indicates that process innovation has a positive impact on the economic performance of the firm. However, it is obvious that product innovation indicators have the strongest positive relationship with the indicators of the economic performance. Therefore, we can say that product innovation has more impact on the economic performance than process innovation.

4.8.10 Innovation & Competitive Advantage

Table (4.50) on the next page, displays the correlation matrix between innovation indicators and the organizational performance indicators.

Table 4.50: correlations between innovation and competitive Advantage

	The speed of response to new customer needs	The ability to tailor products/services to individual customer needs	The speed at which new markets can be entered	The rate of introduction of new products/services
Pd: continuous production of new products	.520 .000	.644 .000	.593 .000	.553 .000
Pd: quick production of new products according to the market	.615 .000	.604 .000	.646 .000	.530 .000
Pd: continuous adjustments of products design	.640 .000	.713 .000	.634 .000	.613 .000
Ps: developing production processes	.638 .000	.681 .000	.700 .000	.555 .000
Ps: Improving production processes	.562 .000	.531 .000	.647 .000	.569 .000
Ps: using new mechanisms at work to reduce the cost	.295 .032	.407 .002	.421 .002	.387 .004
Ps: using the modern technology	.500 .000	.502 .000	.655 .000	.392 .004

The matrix shows that product innovation indicators have significant and moderate positive relationships with competitive advantage indicators. The empirical results indicate that when firms are concerned about the continuous production of new products, they will have the ability to customize products to meet individual needs and will be able to enter new markets faster than their competitors. Moreover, firms with a willingness to produce new products according to market requirements are faster than their competitors in terms of responding to the customers' needs and in entering new markets. In addition, when firms adjust their products design to enter new markets they will be more able to customize their products and to respond to new customer needs better than their competitors. This means that product innovation has a positive impact on the firm's competitive advantage.

According to process innovation, it is clear from the matrix that process innovation indicators also have significant and moderate positive relationships with the competitive advantage indicators. The empirical results indicate that firms that are interested in developing their production processes had a competitive advantage over their

competitors in term of customizing their products and entering into new markets. Moreover, firms that are interested in improving their production processes had introduced new products in the market, responded to their customers' needs, and entered more markets than their competitors. Moreover, firms with interests in using new mechanisms at work that reduce the costs had the ability to customize their products and occupied new markets. Furthermore, firms that interested in using the modern technology in production had responded to new customer needs, customized products, and entered more markets than their competitors. In other words, this indicates that process innovation has a positive impact on the firm's competitive advantage.

However, it is clear from the matrix that product innovation indicators have the strongest positive relationship with the competitive advantage indicators than process innovation indicators. Hence, product innovation has more impact on the competitive advantage than process innovation.

4.8.11 Innovation, Age, Capital & Labor

Table (4.51) displays the correlation matrix between innovation indicators and the firm's characteristics.

Table 4.51 correlations between innovation, machines, employment, and age

	Number of working machines in 2014	Current cost of working Machine in US Dollars	Number of Workers in 2014	Age of the firm
Pd: continuous production of new products	.361 .009	.350 .020	.323 .021	.181 .204
Pd: quick production of new products according to the market	.370 .008	.312 .039	.332 .017	.237 .094
Pd: continuous adjustments of products design	.384 .005	.263 **.084**	.343 .014	.207 .146
Ps: developing production processes	.418 .002	.474 .001	.346 .013	.164 .250
Ps: Improving production processes	.342 .014	.424 .004	.304 .030	.155 .276
Ps: using new mechanisms at work to reduce the cost	.380 .006	.284 **.061**	.288 .040	.282 .045
Ps: using the modern technology	.292 .038	.244 **.110**	.269 **.056**	.199 .162

The empirical results indicate that a mutual and positive relationship exists between innovation and the number of working machines. On the other hand, there is also a

positive relationship between innovation and employment. It is clear that when firms perform product innovation, this will increase their labor and the size. Moreover, firms that developed or improved their production processes and interested in using new mechanisms at work have increased their employment during 2012 – 2014. Concerning the age, the empirical results indicate that there is an insignificant relationship between the firm's age and innovation. In other words, this means that firms can innovate regardless of their age.

Chapter 5

Results, Evaluations and Future Insights of the Palestinian Plastic Industry

In this chapter, the empirical results are evaluated and compared with the results of previous studies. Trends and future insights of the Palestinian plastic industry are also discussed.

5.1 Firms' Characteristics

The vast majority of plastic firms are concentrated in Al-Khalil (Hebron) district (Palestinian Federation of Industries, 2009), and most of the plastic firms in the West Bank founded before 2001 by people with experience in this field who may have worked in this profession in the past. On average, Plastic firms employed 14 workers in 2014 with an average cost of machine slightly less than $400,000. Concerning the production, it is concentrated in Plastic Bags, plastic boxes, sanitary ware, and pipes.

5.2 Innovation

The descriptive results indicate that there is a very slight innovation potential in plastic firms where only very few firms were able to perform process innovations, and a small percentage (37%) had performed product innovations.

Concerning the attitudes of Palestinian plastic firms toward innovation, this study found that Palestinian plastic firms have a slight willingness to innovate through performing product and process innovations in general. On the other hand, it found that plastic firms have weak motivations to perform non-technological innovations (marketing & organizational innovations).

The study also found that Palestinian plastic firms are slightly more willing to perform process innovations rather than adopting product innovations. The most important point is that plastic firms tend to adopt process innovations by acquiring new machinery and equipment in order to reduce the production costs. This could be attributed to the fact that, reducing the production costs allows firms to compete with foreign imported products especially from the Turkish and the Chinese plastic products that invaded the local market, and this lead to a decrease the Palestinian imports. Hence, throughout reducing the imports of any nation the GDP of that nation will increase holding other things are constant. These process innovations allow firms to gain a cost advantage over their competitors by providing cheaper products (through lowering the cost of units produced) or providing better quality products that are difficult for competitors to imitate (Rosi & Sidek, 2013).

Therefore, performing process innovations through reducing the total cost of production is vital for firms that plan to enter new markets. Unfortunately, the majority of plastic firms keep on producing with a rebuild or old machines & equipment in the production process due to the lack of sufficient credit to purchase upgraded machinery & equipment. This was supported by previous studies, which found that machinery and the lack maintenance parts are the two major obstacles that face plastic industry (Palestinian Federation of Industries, 2009; Sabri, 1999).

Thus, without reducing the production costs, innovations will be futile because the costs of these innovations will not overcome the outcomes or benefits from it, and that require bulky investments in new technology (Rosi & Sidek, 2013; Voana & Pianta, 2006). This was supported by Nybak (2012), which found that the firm would be innovative in improving the production process to reduce the cost.

Regarding technology, it is the most important element for process innovations because the quality is associated with new and updated technology, which allow firms to control their production elements. However, Palestinian plastic firms have a very slight interest in using new technology in the production processes, which is associated with acquiring new machinery & equipment as mentioned before. These results do not contradict with the previous studies, which demonstrated that Palestinian firms depend on old technology in manufacturing and that forced Palestinian exports to be more concentrated in low technology sectors (PalTrade, 2014).

Therefore, since Palestinian plastic industry is still working with old technology, it needs to improve and certify its products quality in order to be able to penetrate external or

foreign markets.

Another important point is that Palestinian plastic firms are slightly more interested in improving their production methods than developing their existing methods, which means that plastic industry operates with traditional production methods.

With relation to product innovations, the most prominent element or interest in adopting product innovations is the production of new products according to the market requirement – which was supported by the interviews with plastic firms – as a result of the rapid changes in customers' needs and attitudes. Moreover, these changes in products are associated with changing the templates or production molds, which are very expensive that not all firms can bear.

According to which type of product lines had experienced process innovation. Only foam, housewares, furniture, sanitary ware, boxes, and Plastic Bags had experienced process innovations during 2012-2014 where there was a gradual increase in the number of products that their ways or methods of production had been changed. In addition, foam production has experienced the largest number of products that their production processes were changed during the same period. Thus, the results indicate that process innovations are limited to certain product lines that require advanced technological procedures such as foam, plastic housewares, plastic furniture, sanitary ware, and Plastic Bags.

The results also indicate that product innovations are more available for plastic firms where more firms were able to perform incremental changes on their products than changing the production processes.

5.3 Firms Characteristics

5.3.1 Age & Size

Starting with the size & age, for both types of innovation, innovative firms are slightly older and much bigger in size than non-innovative ones. Moreover, it is found that there is a mutual relationship between innovation and the firm's age, which that supports the findings of previous studies (Zemplinerová & Hromádková, 2012; Molero & García, 2008; Yeh-Yun Lin & Yi-Ching Chen, 2007, Pianta & Vaona, 2006; Calantone, Cavusgil & Zhao, 2002; Nybakk, 2012; Calantone, Cavusgil, Zhao, 2002).

However, the results indicated that process innovative firms are bigger than product

innovative ones, and this finding supported by (Molero & García, 2008).
Concerning the age, there was no difference between innovative and non-innovative firms in terms of age, and the study found that plastic firms could innovate despite their age. Moreover, the study found that there is no relationship between innovation and the age.

5.3.2 Finance / Cost of Machines

According to finance, it is found that both product and process innovative firms have more access to finance by owning more costly machines. Nevertheless, concerning the difference between innovative and non-innovative firms in terms of the cost of machines or access to finance, there was no actual difference between innovative and non-innovative firms, which means that finance is not an important factor for firms to perform innovations. This finding supports the findings of Grabowski et al. (2013) & Molero & García (2008). And contradicts with Zemplinerová & Hromádková (2012), which found a significant negative relationship between access to finance and innovation output, but their results did not explain the efficiency of supported firms in their study. Moreover, there is an obvious difference between product and process innovative firms where process innovative firms own more costly machines & equipment than product innovative firms, which contradicts the study of Molero & García (2008).

5.4 Drivers of Innovation

5.4.1 Creativity

Concerning the creativity, this study found that Palestinian plastic industry tends more to use traditional production procedures than adopting new creative ideas and solutions, and creativity is the most important element for innovation. Moreover, the highest priority for these firms is to come up with new and creative ideas that will contribute to shrinking the production costs. This was supported by Okpara (2007), which argued that creativity brings into existence new methods or solutions to existing problems. However, plastic firms have a moderate intention to come up with new or creative ideas that could improve the production processes to reduce the costs and to use new ideas or production methods that could lead to reducing the production costs. This could be attributed to the fact that coming up with new production method requires new machinery & equipment,

which is one of the major obstacles that face Palestinian industries. In this study, innovative firms showed more positive attitudes toward creativity more than non-innovative firms (showed poor attitudes).

Moreover, this study found a mutually positive relationship between creativity and innovation. This finding was supported by many previous studies, which argued that creativity is a major driving force behind innovations, and it is an essential element for innovation (Glasberg & Ouerghemi, 2011; Lukić, 2012; Okpara, 2007; Kalyani, 2011; Glasberg & Ouerghemi, 2011).

According to the difference in attitudes between product and process innovative firms, there is not an obvious difference between both types of innovation, but the study found that process innovative firms have slightly more attitudes toward creativity. Moreover, the study also found that there is a strong significant difference between innovative and non-innovate firms in terms creativity, which means that creativity is a major and important driving force behind performing innovations.

Based on the hypothesized relationship between innovation and creativity we conclude creativity contributes significantly to innovation.

5.4.2 Knowledge

Regarding the internal knowledge, the study found that internal knowledge is an important element for developing the plastic industry in the West Bank. Internal knowledge allows firms to create their own knowledge that will be an input for their outputs. Hence, the most important source of knowledge for Palestinian firms is the knowledge that produced through developing and testing the products. This new knowledge (know-how) could allow firms to develop and differentiate their products in the local and external markets, which leads to competitive advantage. Moreover, sharing this knowledge among the staff equips them with proper knowledge or expertise that could contribute to the development of the firm's production processes and products. In addition to that, exchanging this internal knowledge & experiences among the staff allows them to be familiar with all the parts or divisions of the firm. For example, if a worker leaves or was absent because of illness or other causes, there will be an alternative worker that will be able to do the other's job and keep the work in progress. Moreover, the study found that plastic firms tend to train their staff in order to improve their skills besides gaining a proper & how-to-do knowledge, which equip the staff with

needed skills that could contribute innovations. However, the study found no relationship between the internal training and innovations. In addition, the most important source of internal knowledge that could lead to innovations is the in-house R&D, but the study found that plastic firms are not very much aware of R&D. In addition, plastic firms are non-R&D innovators because they lack special units or departments for this purpose and tend to innovate through managing non-R&D innovation practices. On contrast, plastic firms have a modest intention to conduct development and testing on their production procedures. Moreover, the results showed that plastic firms have a week intention to use advanced machines and technology besides using intermediate and advanced inputs as previously mentioned. Moreover, plastic industry in the West Bank operates with old and renewed machinery that hinder the development process. The study also found that innovative firms have a more slight willingness to utilize the internal knowledge than non-innovative firms. Moreover, the empirical results demonstrated that there is a positive relationship between the usage of internal sources of knowledge and innovation, which supported by many previous studies (Calantone, Cavusgil, Zhao, 2002; Svetina & Prodan 2008; OECD & Eurostat, 2005; Okpara, 2007; Molero & García, 2008; Toner 2011; Matthews, 2003; Sakala & Kolster, 2014; Lin, 2007; UNECE , 2012).

Nevertheless, according to the statistical difference between innovative and non-innovative firms in terms of internal knowledge, the study found a significant difference between innovative and non-innovative firms regarding the internal knowledge.

According to the external knowledge, the Palestinian plastic industry is considered a closed one because it lacks the exploitation of the sources of external knowledge. Plastic firms have very week interests about using the external sources of knowledge, and they depend extremely on their customers for obtaining external knowledge. Therefore, the majority of plastic firms depend on non-R&D activities to innovate. Huang, Arundel & Hollanders (2010) supported this point, which found that firms which used other sources of important information such as clients, universities, and research institutions have more chance to perform R&D while firms that obtain information from competitors and suppliers are more likely to perform non-R&D innovative activities. This kind of interaction allows any firm to collect useful information about the needs or tastes of local customers and clients, which motivates the firm to study the possibility of developing or changing their existing products. Moreover, this kind of knowledge helps firms to

introduce new products or product lines in the market, to improve the quality of their existing products or to reduce the cost through performing new production process in order to make the price of the certain product affordable. Moreover, this kind of knowledge supplies the firms with the proper knowledge, information, and feedback about their product, which could warn the firm to avoid costly mistakes. Unfortunately, plastic firms have a very weak interest in employing the knowledge produced from external research results. This knowledge and information keep the firms updated with contemporary science and technology. In addition, the results of the study also showed that plastic firms have very poor willingness to acquire technical information or patents in order to improve or develop new products or production processes. Hence, plastic firms tend to avoid any investments or extra costs that will develop their existing situation.

According to the external knowledge that could be acquired through the abroad training, plastic firms should concern at this point because the human capital and resources inside any firm are the main actors of innovation. In general, there is a shortage of the qualified personnel in manufacturing and technical areas in the Palestinian industry (PalTrade, 2014).

Through the interviews and open-ended questions, it appeared that there is a shortage of graduates and technicians with expertise in Palestinian plastics industry, and most of the labor is not highly educated. However, the worst problem is that employees with a university education lack the most important theoretical background, terms, practical experience, and basics in plastic field. In addition to that, the results showed that only a very small portion of the firms sent or interested in sending their employees to seminars, workshop, exhibitions, and conferences, which form a major source of external knowledge. This type of external knowledge empowers the participants with a clear image about the reality of the industry and provides them with important and unique ideas that could be transformed in the future into a value by developing or producing new competitive products in the local and external markets.

Concerning the difference between innovative and non-innovative firms, the descriptive results demonstrated that innovative firms are more likely to use the sources of external knowledge than non-innovative firms, and this supported the findings of previous studies (Svetina & Prodan, 2008; Jenssen & Nybakk, 2009; Matthews, 2003; De Jong & Vermeulen, 2004).

Moreover, there is a gap between product innovative and non-innovative firms in terms

of employing the external knowledge. This result was supported by Jenssen & Nybakk (2009), which found a positive relationship between product innovation and external knowledge. In general, there is an obvious difference between innovative and non-innovative firms. The study found that firms with stronger attitudes toward exploiting the sources of external knowledge are more likely to innovate. In addition, concerning the statistical difference between innovative and non-innovative firms, it is found that external knowledge has a strong significant influence on both types of innovation with a stronger effect on process innovation. Moreover, the empirical results indicate that there is a positive relationship between external knowledge and performing innovations, which these findings are in line with previous literature (Matthews, 2003 Lin, 2007; Toner, 2011; Rose et al., 2009; Svetina & Prodan, 2008).

5.4.3 Linkages

Concerning the external linkages, the results showed that plastic firms have a slight willingness to establish external linkages and relationships outside their boundaries. The results indicate that plastic firms tend to establish external linkages though having good relations with their suppliers who are a useful source of proper information about the market requirements, customer tastes, and competition.

Moreover, plastic firms have a strong willingness to be a member of Commercial Chambers, scientific organizations, and industrial associations, and there is a slight positive intention to participate in foreign exhibition and seminars. On the other hand, plastic industry should have no interest in building connections and networks with competitors inside the industry, which makes the flow of knowledge and information easier between the firms in the industry.

Unfortunately, plastic firms have a poor collaboration between other companies, universities, or scientific institutions. These kind of collaborations are important because there are mutual interests for both parties.

The results revealed that innovative firms tend to build more external linkages than non-innovative ones. Moreover, the empirical results indicate that there is weak significant positive relationship between the indicators of innovation and external linkages, and that don't contradict the results of previous studies (UNECE , 2012; Jenssen & Nybakk, 2009; Zemplinerová & Hromádková, 2012; Svetina & Prodan, 2008; Svetina & Prodan, 2008; OECD & Eurostat, 2005).

However, this difference between innovative and non-innovative firms is much obvious between product innovative and non-product innovative firms and that coincide with the findings of De Jong & Vermeulen (2004), Jenssen & Nybakk (2009), and Lages, Silva & Styles (2009).
Furthermore, the statistical results supported this kind of relationship. The results showed that there is a significant difference between innovative and non-innovative firms in terms of the external linkages, where this difference is more significant for process innovation.

With respect to the internal linkages, plastic firms are characterized by good internal ties in terms of the internal relations between their managers, workers, and the internal departments. That means, there are good channels that facilitate the transfer of internal knowledge between these parties. It is also found that firms with strong intentions toward establishing internal linkages are more likely to innovative, (Jenssen Nybakk, 2009; Mazzarol, 2002; Deloitte, 2005) Matthews, 2003).
The empirical results demonstrated that there is a significant and positive relationship between internal knowledge and innovations. Furthermore, the study found that there is a significant difference between innovative and non-innovative firms in terms of internal knowledge. Also, process innovative firms had more significant difference than product innovative ones.

5.4.4 Environment and culture

Plastic firms need to develop their innovative environment and internal culture by creating a suiTable atmosphere for brainstorming that triggers the birth of creative ideas, which could lead to developing their existing products, coming up with new products or improving the production methods. Unfortunately, plastic firms lack the system that encourages their staff to participate in developing and improving production procedures. Moreover, there is a prominent divergence between innovative and non-innovative firms. This wide gap between innovative and non-innovative firms exists because organizational culture is the most complex element for innovation. The empirical results demonstrated that there is a significant positive weak relationship between innovation and innovative environment in general. This finding agrees with the findings of previous studies (Toner, 2011; Hassan et al., 2013; Glasberg & Ouerghemi (2011); Mazzarol,

2002; Parzefall, Seeck & leppänen, 2008; Nybakk, 2012; Eris, Neczan & Ozmen (2012); Eris, Neczan & Ozmen, 2012; Chao et al., 2010; Kalyani, 2011; Deloitte, 2005).

5.4.5 Obstacles to innovate

Keeping in mind the reasons that hinder innovation, we must take into account the most prominent reasons that hinder innovations in the Palestinian plastics industry. The descriptive results indicated that the most important obstacle is the bad economic situation in Palestine, which hinders the development of existing products and methods because of the inability of plastic firms to generate funds to renew their old machines or the acquisition of new ones in order to open new production lines. In addition, this bad economic situation caused the suspension of the economy in the domestic market, which negatively affected the number of products and items that could be marketed in the local market. Also, the results showed that innovation is a very expensive procedure because it requires an exorbitant budget to purchase the necessary machinery and equipment for production (Rosli & Sidek, 2013; Jenssen & Nybakk, 2009).

It was also found that process innovation is more expensive than product innovation because changing or improving the production methods requires a radical change in machinery. On the other hand, the legal procedures and taxes play a major role in hindering the innovation process, so that there is a shed from the governmental financial agencies on the taxation issues, and there is no tax exemption system that encourages the Palestinian industry and investment.

However, the empirical results demonstrated that there is a negative relationship between microeconomic obstacles and all types of innovation. This means that firms do not perform innovations due to issues related to the internal financial situation of the firm rather than the external or macroeconomic factors.

5.5 Outcomes of Innovation

5.5.1 Employment

Over the past three years, innovative firms had employed more employees than non-innovate firms. The empirical results demonstrated that there is a positive relationship between innovation and employment. This means that the impact of innovation on employment is obvious during 2012-2014. This finding is in line with many previous

studies (Pianta, 2005; Meriküll, 2008; Zimmermann, 2008; Khatib et al., 2013).
Moreover, we see that the impact of process innovation here is more effective than product innovation, and that contradicts the findings of Pianta (2005) and Meriküll (2008), which found that the impact of product innovation on employment is more effective than process innovation. Hence, which type of innovation has more impact on employment is still ambiguous (Zimmermann, 2008).

5.5.2 Exports

According to the impact of innovation on the exports, the empirical results did not show any significant relationship between innovation and exports or the number of external markets. On the other hand, the descriptive results showed that both types of innovation had increased the exports and the number of external markers over the past three years. These results support the finding of previous studies (Bocquet & Musso, 2011; Roper & Love, 2001; REÇICA, 2010; Khatib et al., 2013).
However, which type of innovation had more exports during 2012-2014? The descriptive results showed that product innovative firms had more exports than process innovative ones, and that was supported by Roper & Love (2001), Karasek (2012), and Bocquet & Musso (2011). In contrast, the study found that process innovative firms had increased the number of their external markets more than product innovative ones.

5.5.3 Performance

During 2012 – 2014, there was a slight good improvement in the organizational performance of plastic firms. However, the weak point is that the staff of these firms needs to strengthen their capacity in order to have more desire to learn and improve their skills. Moreover, for the situation for the economic performance of plastic firms, it has been sTable during 2012 - 2014. This implies that there was no tangible and significant development in this industry.
According to the overall performance of innovative firms, the empirical results indicated that there is a positive mutual relationship between innovations and firms' performance. This could be attributed to the fact that innovation is a driving force behind improving the overall performance. Concerning the descriptive results, both product and process innovative firms had improved their organizational and economic performance, and this

result supports the finding of previous studies included in the literature (Kemp et al., 2003; Yeh-Yun Lin & Yi-Ching Chen, 2007; Cameron 1998; Grabowski et al., 2013; Hassan et al. 2013; Rosli & Sidek, 2013; Lages, Silva & Styles, 2009).

For the organizational performance, both types of innovation had improved the performance over the past three years, because the main goal of innovation is to improve the organizational performance of the firm (Yeh-Yun Lin & Yi-Ching Chen, 2007).

According to which type of innovation had more impact on the performance, the descriptive results demonstrated that product and process innovations had increased and improved the market share, sales, and the profits; product innovative firms had improved their sales more than process innovative ones whereas process innovative firms had improved their market share and profits more than product innovative firms. Hence, which type of innovation has the most impact on the performance is still ambiguous because process innovation had a stronger impact on the organizational performance while product innovation had more impact on the firm's economic performance, which supported by Lages, Silva & Styles (2009) & Rosli & Sidek (2013). Also, the results imply that there is a difference in the performance between innovative and non-innovate firms; both types of innovations has an equal and very strong significant impact on the performance.

The hypothesized relationship between innovation and performance that developed in the theoretical framework still give a guideline for the empirical results, while further theoretical and empirical work will be required to validate and confirm these findings in terms of the impact of innovation on exporting.

5.5.4 Competitive Advantage

The results showed that competitive advantage was almost steady for plastic firms during 2012 – 2014. However, there is a weakness in the competitive advantage in terms of the speed in entering new markets and the introduction of new products. The empirical results indicated that there is a positive relationship between innovation and the competitive advantage.

With relation to the impact of innovation on competitive advantage, both product and process innovative firms had improved the firms' competitive advantage equally during 2012 - 2014. Moreover, all types of innovation has an equal and very strong significant impact on the competitive advantage and that supports the main goal of innovation

(Kalyani, 2011; Lukić, 2012; Deloitte, 2005; Matthews, 2003; Rosli & Sidek, 2013; Rose et al., 2009; Lin, 2007; Kalyani, 2011 Hurley & Hult, 1998; Urbancová,2013).

In summary, there is a huge difference between the outcomes of innovation on employment, organizational performance, competitive advantage and the firm's performance. Process innovative firms have more workers than product innovative firms, and process innovative firms had improved the firm's organizational performance better than product innovative firms. In contrast, product innovative firms had improved their performance better than product innovative ones. However, the competitive advantage for product and process innovative firms is close to each other; process innovative firms had improved their competitive advantage very slightly more than product innovative ones.

5.6 The current situation of the Palestinian plastic industry

The industrial sector is one of the most important sectors for investment that has significant and direct positive impact on the Palestinian economy. However, the situation of the Palestinian plastics industry in the West Bank is still in a rudimentary stage that suffers from many problems related to the economic and political situation.

Palestinian plastic firms had changed their products' shape or characteristics more than their existing production processes. However, this industry has more willingness to innovate through performing process innovations in general. The reason behind that could be attributed to the fact that Palestinian plastic firms tend to move from traditional production processes to advanced production processes. Adopting advanced production processes allow plastic firms to produce with more efficiency and lower production costs. In fact, reducing the cost of production would enhance the competitiveness of local products in the domestic market as well as in the export markets. However, advanced production processes call for investment in new machinery and equipment that require huge capital to be employed.

Concerning product innovation, only small portion of plastic firms (37%) had performed changes in their products in terms of shape and characteristics where non-traditional product lines had witnessed the most changes in their products. Moreover, the main interest of plastic firms is to produce new products according to the market requirements,

and this requires parallel changes in the molds and machines depending on the product. This resulted in a few number of products with very limited changes that characterized by low technology. This could be attributed to two main reasons. On one hand, this indicates that there are markets for plastic products or there is growth and evolution in the domestic and Israeli markets. On the other hand, this also indicates that there are strong competitions that push firms to differentiate their products in line with market requirements in order to maintain their position in the market. Thus, this industry could revive and thrive through the diversification of its products to meet more needs and cover more markets.

The study found that only big firms with financial stability had performed process innovations. However, plastic firms performed more product innovations than process innovation during 2012-2014. On the other hand, plastic firms have more willingness to perform process innovations than performing product innovations. This could be attributed to the fact that there is strong competition in the domestic market, which makes firms more interested in reducing the cost that in turn affect the price. Moreover, product lines that witnessed changes in their production processes had changed their products' shape or characteristics. In other words, changing the products shape or characteristics is associated with changing the production processes, or vice versa.

During 2012 – 2014, Palestinian plastic industry witnessed a slow growth in terms of market share, sales, and employment. On the other hand, this industry had experienced a slow decline in profits due to the increase in the prices of raw materials, other inputs, and transportation costs. In order to solve the problem of the high production costs, it was clear that big firms, which produce sophisticated products, were able to introduce new and advanced production methods in order to shrink the production costs. This could be attributed to the fact that changing the production processes are associated with employing new machines and equipment, that require a heavy budget in order to do so.

Concerning the exports, the domestic market consumes the biggest portion of the plastic products and Israel forms the largest external market. Moreover, about one-third of the firms had witnessed an increase in their sales to external markets where Israel forms the largest destination of plastic products. However, only a small portion of the firms (about 7%) had sold their products to new external markets. In other words, this indicates that Palestinian plastic firms have a very weak ability to produce new products or to produce products that could enter into external markets. Thus, there is a very slight growth in the export for Palestinian firms and a slight decline in the number of external markets. In

other words, this indicates that the Palestinian plastic industry is not eligible to compete with foreign goods or to penetrate into the foreign markets because they lack the international standards and quality. Also, this demonstrates the weakness of the Palestinian plastic industry where only a few product lines (plastic housewares & sanitary wares) had exported their products to foreign markets during 2012-2014. Therefore, Palestinian plastic industry needs more improvements to conquer foreign markets.

Concerning the performance, there was a slight growth in the performance of Palestinian plastic firms. Palestinian plastics firms in the West Bank had experienced a very slow growth in terms of export performance, employment, and size. The reason behind that related to two reasons. The first reason is that most of the plastic firms are small-sized enterprises, which it is difficult for them to be developed and to operate with advanced machines and equipment. The second reason is that Palestinian plastic firms produce simple and traditional products that cannot compete with imported products or penetrate foreign markets.

5.7 Trends of the Plastic industry toward innovation and factors influencing innovation

There are essential factors that play a key role in innovation in the Palestinian industries. These factors are creativity, internal & external knowledge, internal & external linkages, and the firm's environment. The reality of the industry indicates that there is a possibility to develop this industry if firms use the creativity factor by employing new ideas that relate to the production of new products or ideas related to the development of the current production methods. Moreover, there is a desire for a large part of plastic firms in employing these creative ideas within their boundaries, but Palestinian plastics firms, in general, have weak attitudes toward employing creativity factor in the industry.

What Palestinian plastic firms care about is to offer new innovative ideas that contribute to reducing the production costs, which are associated with changing the current production methods. This allows plastic firms to produce with the lowest cost and highest standards to be able to compete with other firms. In addition, there is a strong relationship between the creativity and all types of innovation. Moreover, plastic firms tend to innovate through the employment of novel ideas, which related to the production

of new products that no firm had produced before. As for process innovations, ideas provided by the staff could develop the existing production methods, which in turn could contribute significantly to the development of the current production methods.

Other factors that are important to perform innovations are the internal and external knowledge sources. There is a strong motivation for plastic firms to benefit from their internal knowledge by sharing this knowledge among all staff and departments of the firm. It is found that those firms tend to do experiments and tests on their products and production processes. Also, they are interested in training the workforce within the firm to acquire the necessary skills to work. This leads to increase the stock of knowledge about products and production methods. In addition, there are good intentions to do R&D inside plastic firms. It turns out that R&D is the key factor for developing the products in terms of shape and characteristics. Moreover, the exchange of experiences and knowledge between the staff and the use of modern machines or sophisticated software, has an active role in the development of existing production methods or adopting new ways of production.

As for external knowledge, it has been shown that plastic industry in the West Bank still a closed industry on itself where plastic firms do not benefit from the sources of knowledge outside their boundaries. It is found that the main source of information that inflows into the firm from the outside is the direct or indirect knowledge obtained from customers. However, the results showed that external knowledge gained from seminars, workshops, conferences or exhibitions could have the most contribution to performing product innovations. Also, external knowledge from the results of scientific research and publications found to have the most contribution to the development and improvement of existing production methods. However, plastic industry has weak motivations toward exploiting these sources.

In order to get necessary knowledge, firms must build relationships and create ties outside their boundaries. Palestinian plastic firms have weak tendencies toward building this kind of linkages. However, they are geared towards making links through their membership in the Chambers of Commerce and industry associations in addition to participating in conferences and exhibitions. The results indicated that participation in seminars and conferences are instrumental to both product and process innovations.

Regarding the internal linkages, Palestinian plastics firms are directed towards strengthening their internal linkages between their staff, managers, and departments. It has shown that when a firm makes internal ties through discussing important decisions

or information with their board, they contribute significantly towards performing innovations.

Concerning the environment, most firms lack the environment that stimulates innovation. The study found that firms tend to create an innovative environment through adopting a rewarding system and stimulating the staff to learn and develop their skills.

Unfortunately, there are macro and microeconomic factors that hinder innovation in the Palestinian plastic industry. It was found that the bad economic situation in Palestine hinders innovation, especially the process innovations because this kind of innovations requires huge financial resources and costly machines. Moreover, the results indicated that microeconomic factors are the biggest obstacles to innovate. In other words, problems in innovation are related to specific issued of o the firm itself rather than other external factors.

The main goal of innovation is to obtain a competitive advantage, which allows the firm to distinct itself from others in order to compete and maintain itself in the market or to enter new markets. The results indicate that Palestinian plastic firms are still in a sTable phase towards enhancing their competitiveness that leads to increasing the firm's profitability. It has shown that innovations have a positive role in achieving the competitive advantage. Firms that performed innovations or that showed stronger attitudes toward innovation had achieved or improved their competitive advantage during 2012-2014.

Concerning the overall performance, Palestinian plastic firms in the West Bank are still in a sTable phase towards improving their overall performance. The study showed that plastic firms that are more interested in performing innovations had significantly improved their performance.

5.8 Future Insights

This study provided a detailed and clear explanation about product and process innovations in the Palestinian plastics industry through studying the factors affecting innovations in the industry. This was done through providing a descriptive analysis of these factors and the interpretation of the relationship between the influential factors on innovation. Also, this study explained the performance of the Palestinian plastics firms and the innovation impacts on of several aspects such as employment, exports and

number of external markets. Throughout this study, it has been able to detect the most important drivers that would stimulate the Palestinian plastic industry in the West Bank. Despite the political and economic constraints facing the Palestinian plastic industry, it is characterized by the availability of a good number of production lines and products with the availability of different markets for each product line. The study indicates that despite the obstacles fronting this industry, there are entrepreneurial indicators that promote the concept of innovation. This means that there is a shining future for this industry, if plastic firms continue their efforts towards employing innovation in their work through its main drivers. Moreover, the future expectations also expect that those small firms, which do not have the ability to innovate or that lack of funding resources for performing innovations, will stop working in the short or long term.

Chapter 6

Conclusions & Recommendations

This study thereby gives a holistic view about product and process innovations in the Palestinian plastic industry. The study tended to investigate the antecedents and the outcomes of innovation in the Palestinian plastic industry with a particular focus on the role of non-R&D activities. Through gaining insinuation from a variety of empirical and theoretical perspectives, the general questions were addressed under what conditions plastic firms in the West Bank could develop innovations. This chapter provides a conclusion based on the main results of this study besides providing some ideas and recommendations for different sides plus suggestions for future research, based on the findings at the end of this chapter.

6.1 Summary

The overriding purpose of this study was to find out how to develop the Palestinian industry and specifically the plastic industry in the West Bank though adopting innovations. To achieve that goal it was necessary to study the specifications of plastic industry and the prerequisite driving factors that could induce innovation, besides the outcomes of innovation on different functional areas in the Palestinian industry.

This study investigated the characteristic of the plastic industry through discussing its activity. Related to these characteristics, it became necessary to form an understanding of the role of innovation in developing this industry. To understand how firms could innovate, the theoretical framework of this study tried to explain innovation through understanding its main drivers, performance, and outcomes.

The theoretical framework provided a detailed explanation of the most relevant variables that could determine innovation in the Palestinian industry. Moreover, the theoretical chapter explained the outcomes of innovation on various aspects of the economy such as employment, exports, performance, and the competitive advantage. It was important through the theoretical chapter to provide a theoretical model, which clarifies how these driving variables relate to each other in order to be able to compare the findings of this study with previous ones.

To get a more fine-grained picture of the innovation process, two major types of innovation (product and process innovations) were extensively explored. To get an easy definition for innovation that could be applied to the Palestinian industry, a commonly used definition of product and process innovations were developed. After that, the study was able to go forward to collect primary data from the field and the questionnaires were distributed to plastic firms in the West Bank. Both quantitative and qualitative approaches were followed in this study to explore further the characteristics and attributes of plastic firms in general. The researcher conducted the questionnaire on a sample of Palestinian firms in West Bank (N=53). The sample attempted to include all the population due to its small and undetermined size; firms' name and location were provided through connections with Chambers of Commerce across the West Bank. The descriptive statistics, one-way ANOVA t-test and the Pearson correlation test were used to analyze the data obtained from the questionnaire. The second test was used to test if there is a significant difference between innovative and non-innovative firms in terms of innovation drivers and outcomes. On the other hand, Pearson correlation test was used to determine if there is a relationship between innovation drivers and outcomes.

Finally, this study found that creativity, knowledge, linkage and the innovative environment are the most important factors for innovations and besides that, it is also found that bigger firms are more likely to innovate. In addition, innovation found to have a positive influence on different aspects such exports, employment, performance and the competitive advantage.

6.2 Conclusions

Plastic firms in the West Bank are not familiar with innovations and its importance to achieving growth and competitive advantage. This study answered the question about

the importance of innovation in the industry besides how to stimulate innovation by studying its main drivers. It appeared from the study that the majority of plastic firms produce traditional and low technology products where these kinds of products lack innovations. In addition, the study found that plastic firms performed product innovations more than process innovations during 2012 - 2014. However, plastic firms showed that they have more intentions to perform process innovations rather than product innovations through adopting lower cost production processes. That could be attributed to the fact that, the main interest for plastic firms is to reduce their production costs to compete in domestic and external markets.

It turns out that plastic industry in the West Bank still relying on traditional methods of production. The reason behind that is that changing or improving these traditional production methods requires a radical change in the machinery and equipment for modern and sophisticated machines, which are capable of greater high quality and bulk production with lower costs. For this reason, only very few firms were able to change or improve their production methods. Consequently, this resulted in a weakness and low growth in improving the firms' competitiveness.

Concerning product innovations, the center of interest for plastic firms is the production of new products according to the market requirements. These changes are linked with changing the molds and machines according to the type and production line. This explains the reason behind not all firms were able to perform product innovations because it is a very expensive procedure. Thus, this opens an opportunity for importers to market the foreign product in the local market.

Encouraging the industry and innovation in Palestine is a hard duty because it is influenced by financial problems such as the difficulty to obtain a budget and access to finance. Sufficient budget and access to finance make it easier for firms to employ modern machinery and equipment, which enables them to produce new products or to perform incremental changes in their existing products' shape or physical characteristics according to the requirements of domestic and foreign markets.

The size plays an important role in innovations. Hence, it can be concluded that larger firms are more likely to perform innovation because larger firms own more financial resources and advanced or machines. Moreover, larger firms are more able to perform process innovation than smaller ones because process innovations require radical or incremental changes in machinery and equipment.

These finding are in line with other studies that showed that larger firms are more likely

to be innovators (Zemplinerová & Hromádková, 2012; Molero & García, 2008; Yeh-Yun Lin & Yi-Ching Chen, 2007, Pianta & Vaona, 2006; Calantone, Cavusgil & Zhao, 2002; Nybakk, 2012; Calantone, Cavusgil, Zhao, 2002).

However, the age does not seem to affect the innovativeness of plastic firms. The influence of firm's size on innovation was clearly more than the firm's age, which is still mysterious and needs further study.

Regarding the key elements of innovation, the most important source of innovation is creativity. Unfortunately, the Palestinian plastic industry in the West Bank still operates with traditional production methods without tending to make use of creative ideas in order to develop the products and the production. More specifically, it has also turned out to be the most interesting point for firms in creativity is to provide ideas on how to reduce production costs. Also, innovative plastic firms tend to use and employ creative ideas in the production and development where process innovative firms tend to be more creative than product innovative ones.

The results furthermore show that the contribution of knowledge is highly significant in explaining innovation. According to the internal knowledge, it is important for the firms to adopt innovations and to develop the industry. Gaining internal knowledge throughout developing and testing of the products and production processes is the most important element that contributes to increasing the stock of internal knowledge inside the firm. Therefore, this increases the knowledge to develop necessary skills to improve and develop the production. Moreover, plastic firms depend majorly upon non-R&D activities to innovate, and the vast majority of plastic firms are unfamiliar with its importance for developing the industry. Also, this industry suffers from the lack of modern technology in the production process and depends on traditional production methods that will not develop the industry in this technological era.

As for the external knowledge, the study showed that innovative firms are more ambitious than non-innovative ones toward using this type of knowledge. It turned out that plastic firms have poor ability to absorb knowledge from their external environment. This surprising result might be explained by the fact that plastic industry in the West Bank is a closed on itself because firms did not take advantage and benefits greatly from foreign sources of knowledge. Moreover, firms rely solely on the information through communication with customer’s feedback, suppliers, and distributors, and neglect the importance of other information sources from scientific research, patents, and external training of workers. These results are rich sources of information and scientific

experiments in which they can provide useful information on how to develop the products, production methods and the industry in general.

Another point is that innovative firms are more concerned about building and establishing networks and relationships outside their scope, this indicates that there is a direct relationship between these external linkages and innovation. However, the majority of these external links are restricted to suppliers, scientific research institutions, and Chambers of Commerce. However, there is a significant weakness in the external linkages between the competing firms and with other firms in the same industry (plastic industry).

As for internal linkages, most of the Palestinian plastic firms are characterized by their good ties between employees and managers, and between different departments within the company. This study found that the internal linkages play an essential role in innovations where innovative firms are characterized by having stronger internal linkages and relationships than ordinary ones. This kind of linkages have an active role and works as a channel for transferring information to all the parts and divisions of the firm. This implies that firms can innovate through the interaction with other people inside and outside their firms in order to absorb necessary and useful knowledge.

Based on the results of this thesis, it could be argued that innovations require an environment that is conducive towards creative behavior. The study concludes that plastic firms lack the appropriate environment for developing novel ideas and innovations. Plastic firms are still working in a bureaucratic environment that limits the interaction between the staff and lack of catalysts and motivations that could induce innovations. In the Palestinian plastic firm's environments, there is no role for working personnel especially in the development process, and this creates an atmosphere of working routine that could wipe out all the aspects of creativity and innovations. Moreover, there is a wide difference between regular and innovative firms in terms of the innovative environment and culture. Therefore, this innovative environment can be promoted through increasing the personnel willingness to provide unique ideas. Moreover, altering the existing system and working environment within firms could create a competitive and innovative atmosphere through reducing the bureaucracy and creating a system that takes into consideration incentives and rewards. This allows workers and employees to demonstrate and pool their ideas besides involving in the development process in order to perform innovations.

Innovation has an impact on several aspects. It can be concluded that innovations have

a positive impact on the employment where innovative firms hired more labor during 2012 - 2014. It has also shown that process innovative firms had recruited more labor than product innovative ones. This indicates that changes or improvements in the production methods or processes are associated with more employment, but this contrasts the previous studies because working with new and advanced machines usually reduces the employment rate. Thus, it is obvious that plastic firms depend majorly on intensive labor to perform innovations, especially process innovations rather than introducing the advanced technology in the production process. This indicates that plastic firms still producing with old and traditional production processes.

Concerning the impact of innovations on the firm's performance, innovative firms had improved their overall performance better than non-innovative ones, which mean that innovation is a driving force behind improving the firm's performance.

According to the competitive advantage, which it is the main goal of innovation, it has been shown that this feature had not been improved for plastic firms during 2012-2014. Moreover, plastic firms suffer from a weakness in accessing new markets and the introduction of new products in the market. However, innovative firms found to have a significant and positive impact on the competitive advantage, which answered the main objective of innovation.

Concerning the impact of innovations on the exports and the number of foreign markets, this needs more investigation because the study did not show any significant relationship between innovation and the exports. However, the study indicated that innovative firms had more exports and access to foreign markets more than non-innovative firms. Thus, the impact of innovation on the exports needs further investigation.

6.3 Recommendations

Based on the results of the study, the researcher would emphasize many useful recommendations relating to the results of this study that could contribute to developing the Palestinian plastic industry and enrich the future research.

Recommendations for Firms:

- Firms should try to change their traditional production processes through increasing the attention and interest on how to test and develop existing or traditional production processes.
- Firms should make contacts or set up joint collaborations between firms and universities or research institutions.
- Firms and businesses should consider instituting competitive funding for larger, more strategic or collaborative projects.
- Firms and businesses should delegate some business-innovation policy implementation functions.
- Firms should routinely assess projects and instruments to improve and enhance innovation efficiency and effectiveness with long-term objectives. Assessment of the current innovation programs could create awareness and facilitate learning besides strengthening the confirmation base for future revisions to R&D and development strategies.
- Firms, industrial unions, and scientific institutions must work together to build up linkages or networks through creating an interaction and cooperation between firms.
- Firms should expand their knowledge not only within their perimeter but also firms must be informed on a daily basis about what's new in this industry, as well as, to have access to scientific research results.
- Firms should participate in scientific and economic seminars and conferences.

6.3.2 Recommendations for Chambers of Commerce and Industrial Unions:

- Chambers of Commerce and Industrial Unions should participate in encouraging the cooperation in external programs, outer projects, meetings, presentations, conferences, and exhibitions in honor helping firms to cooperate with foreign and international firms.
- Chambers of Commerce and Industrial unions must improve coordination between firms in the same industry and provide aids to research-intensive sectors.

- In Palestine, there is a shortage of qualified personnel in technical areas, besides a lack of skills at the managerial level (PalTrade, 2014). Therefore, intensive workshops for firms are necessary to educate employees and labor about the importance of creativity and intellectual brainstorming.

6.3.3 Recommendations for the Palestinian Government:

- The Palestinian Authority should set up development policies to foster the commercialization of innovations through encouraging the investment in innovative projects.
- The government should support and encourage the industry by cutting the tax and establishing a flexible customs system, especially for small businesses that are eroding and facing the threat of bankruptcy with the passage of time.
- Firms must establish R&D units to be able to perform innovations and improve the industry.
- The government should establish competence centers and incubators so as to encourage the long-term connection with research and innovation.
- A significant fund should be allocated to the Palestinian universities to support research.
- Executing a national innovation strategy is necessary to articulate the connections between research institutions and their impacts on the economic diversification, social welfare and the sustainability of the government's objectives.

6.3.4 Recommendations for universities and the Ministry of Higher Education:

- It is necessary to develop research careers in order to improve the Palestinian scientific research on the plastic industry.
- Universities should introduce new materials and subjects that contain entrepreneurship and innovation fundamentals to allow graduates to manage their businesses in innovative ways.

6.4 Recommendations for further studies

- Future studies must include larger samples through covering various industrial subsectors in order to pinpoint accurately the difference between the drivers of product and process innovation, and their impacts.
- It is better to work with longitudinal data in future studies in order to get results that are more accurate because innovation is a continuous process.
- Future research should take into considerations the attributes of radical and incremental innovation, and how they relate to previous international results.
- Future studies must take into account the role of R&D activities in industrial sectors besides investigating the potential to introduce and perform R&D in small and medium sized firms.
- Future studies should cover a wider range of industries, especially those involving a large number of large factories in order to compare innovations and performance across different industries. In one hand, this could grant policy makers with full picture about the weak industries that call for development in one hand. On the other hand, this will inform about the industries with positive innovative potential.

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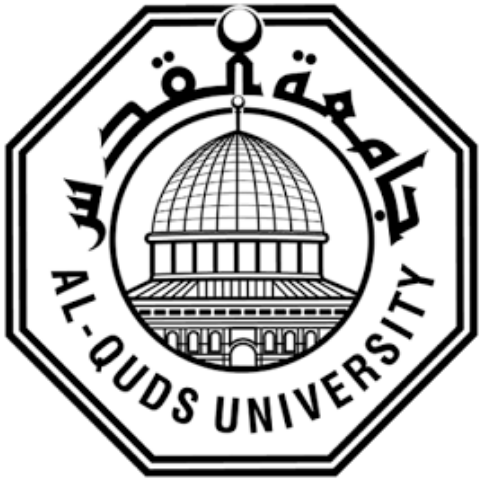
Appendices

Appendix 1: the questionnaire in Arabic



كلية الدراسات العليا
معهد الإدارة والإقتصاد

تهدف هذه الدراسة الى بحث آفاق تطوير وانتاج وتسويق المنتجات التي تقومون بإنتاجها في مصنعكم، وذلك من أجل الحصول على درجة الماجيستير في إدارة الأعمال من جامعة القدس. إن تعاونكم معنا في الإجابة عن الأسئلة الواردة في هذا الإستبيان ستمكّننا من الوصول إلى النتائج التي ستفيدكم في تحديد وتطوير صناعة البلاستيك في فلسطين.

يرجى منكم تعبئة هذا الإستبيان وتحري الدقة والأمانة بالقدر الممكن حتى يتمكن الباحث من الحصول على بيانات موضعية لتحقيق أهداف الدراسة. ومن المتوقع ان تسهم نتائج هذه الدراسة في إثراء موضوع رسالة الماجيستير والبحث العلمي بشكل عام.

للعلم ان جميع المعلومات ستستخدم لغرض البحث العلمي فقط، وسنتعامل معها بسرية تامة.

شاكر لكم حسن تعاونكم

الباحث: فريد مكركر

**** الرجاء الإجابة بوضع إشارة (×) داخل المربعات عدى الخانات التي تتطلب كتابة، بحيث أن جميع الأسئلة تتعلق بالفترة الزمنية لآخر ثلاث سنوات للشركة***

X1	**1. معلومات عامة عن المنشأة**													
X1.1	**إسم المنشأة:**			X1.2		**سنة التأسيس:**								
X1.3	**المحافظة:**													
X1.4	**مهنة صاحب المنشأة السابقة:**	.1	**□ لها علاقة بالعمل الحالي**	X1.5	**المستوى التعليمي لصاحب المنشأة:**	.1	**□ إعدادي**	.2	**□ ثانوي**					
		.2	**□ ليس لها علاقة بالعمل الحالي**			.3	**□دبلوم**	.4	**□بكالوريوس**					
						.5	**□ماجيستير**	.6	**□دكتوراة**					
X1.6	**الكيان القانوني للمنشأة**	.1	**□ شركة فردية**		.2		**□ شراكة (شركة عادية)**							
		.3	**□ شركة مساهمة خاصة**		.4		**□ شركة مساهمة عامة**							
X1.7	**عدد الآلات المستخدمة خلال آخر ثلاث سنوات (بالأرقام)**	**2012**	**2013**	**2014**	X1.8	**تكلفة الآلات والمعدات (دولار أمريكي)**								
		X1.7.1	X1.7.2	X1.7.3										
X1.9	**مصدر استيراد الآلات التي تعمل في المصنع (الدول)**	X1.9.1	**□ الدول الأوروبية**		X1.9.2	**□ الصين**								
		X1.9.3	**□ دول جنوب شرق آسيا**		X1.9.4	**□ الدول العربية**								
		X1.9.5	**□ إسرائيل**		X1.9.6	**□ أمريكا**								
		X1.9.7	**□ غير ذلك، حدد:**											
X1.10	**عدد العاملين خلال آخر ثلاث سنوات (بالأرقام)**	2012	2013	2014										
		X1.10.1	X110.2	X1.10.3										

X1.11	**مجال عمل الآلات:**	X1.11.1	**□ أكياس النايلون**	X1.11.2	**□ عبوات بلاستيكية**	X1.11.3	**□ أدوات صحية وبرابيج وأنابيب**	X1.11.4	**□ أدوات منزلية**					
		X1.11.5	**□ أدوات طبية**	X1.11.6	**□ فرشات وإسفنج صناعي**	X1.11.7	**□ أثاث (طاولات، كراسي)**	X1.11.8	**□ تجهيزات بناء**					
		X1.11.9	**□ ألعاب**	X1.11.10	**□ منتجات أخرى، حدد:**	X1.11.11	**□ منتجات أخرى، حدد:**	X1.11.12	**□ منتجات أخرى، حدد:**					

X1.12	**المنتج يباع بشكل مباشر :**	X1.12.1	**□ من المصنع مباشرة**	X1.12.2	**□ للموزعين (تجار الجملة)**		
		X1.12.3	**□ لتجار التجزئة**	X1.12.4	**□ للتصدير (تشمل إسرائيل)**		

X2	2. هذا القسم يحتوي أسئلة تتعلق بالمنتجات والإنتاج						
X2.A	أ. خلال آخر ثلاث سنوات كانت الحصة السوقية للمنتجات التالية:	تزداد بشكل كبير	تزداد إلى حدٍ ما	لم تتغير	تتراجع إلى حدٍ ما	تتراجع بشكل كبير	لا ينطبق
X2.A.1	أكياس النايلون						
X2.A.2	عبوات بلاستيكية						
X2.A.3	أدوات صحية وبرابيج وأنابيب						
X2.A.4	أدوات منزلية						
X2.A.5	أدوات طبية						
X2.A.6	فرشات وإسفنج صناعي						
X2.A.7	أثاث (طاولات، كراسي)						
X2.A.8	تجهيزات بناء						
X2.A.9	ألعاب						
X2.A.10	منتجات أخرى، حدد:						
X2.A.11	منتجات أخرى، حدد:						
X2.A.12	منتجات أخرى، حدد:						

X2.B	ب. خلال آخر ثلاث سنوات كانت المبيعات السنوية للمنتجات التالية:	تزداد بشكل كبير	تزداد إلى حدٍ ما	لم تتغير	تتراجع إلى حدٍ ما	تتراجع بشكل كبير	لا ينطبق
X2.B.1	أكياس النايلون						
X2.B.2	عبوات بلاستيكية						
X2.B.3	أدوات صحية وبرابيج وأنابيب						
X2.B.4	أدوات منزلية						
X2.B.5	أدوات طبية						
X2.B.6	فرشات وإسفنج صناعي						
X2.B.7	أثاث (طاولات، كراسي)						
X2.B.8	تجهيزات بناء						
X2.B.9	ألعاب						
X2.B.10	منتجات أخرى، حدد:						
X2.B.11	منتجات أخرى، حدد:						
X2.B.12	منتجات أخرى، حدد:						

X2.C	ب. خلال آخر ثلاث سنوات كانت إيرادات المبيعات السنوية للمنتجات التالية:	تزداد بشكل كبير	تزداد إلى حدٍ ما	لم تتغير	تتراجع إلى حدٍ ما	تتراجع بشكل كبير	لا ينطبق
X2.C.1	أكياس النايلون						
X2.C.2	عبوات بلاستيكية						
X2.C.3	أدوات صحية وبرابيج وأنابيب						
X2.C.4	أدوات منزلية						
X2.C.5	أدوات طبية						
X2.C.6	فرشات وإسفنج صناعي						
X2.C.7	أثاث (طاولات، كراسي)						
X2.C.8	تجهيزات بناء						
X2.C.9	ألعاب						
X2.C.10	منتجات أخرى، حدد:						
X2.C.11	منتجات أخرى، حدد:						
X2.C.12	منتجات أخرى، حدد:						

X3	3. توزيع المبيعات والصادرات (تشمل إسرائيل) للمنشأة في الدول والاسواق التالية خلال آخر ثلاث سنوات						
X3.A	أ. خلال آخر ثلاث سنوات كانت حصة الصادرات للمنتجات التالية:	تزداد بشكل كبير	تزداد إلى حدٍ ما	لم تتغير	تتراجع إلى حدٍ ما	تتراجع بشكل كبير	لا ينطبق
X3.A.1	أكياس النايلون						
X3.A.2	عبوات بلاستيكية						
X3.A.3	أدوات صحية وبرابيج وأنابيب						
X3.A.4	أدوات منزلية						
X3.A.5	أدوات طبية						
X3.A.6	فرشات وإسفنج صناعي						
X3.A.7	أثاث (طاولات، كراسي)						
X3.A.8	تجهيزات بناء						
X3.A.9	ألعاب						
X3.A.10	منتجات أخرى، حدد:						
X3.A.11	منتجات أخرى، حدد:						
X3.A.12	منتجات أخرى، حدد:						

X3.B	ب. خلال آخر ثلاث سنوات كان عدد الأسواق الخارجية (تشمل إسرائيل) التي تصدر لها الشركة للمنتجات التالية:	تزداد بشكل كبير	تزداد إلى حدٍ ما	لم تتغير	تتراجع إلى حدٍ ما	تتراجع بشكل كبير	لا ينطبق
X3.B.1	أكياس النايلون						
X3.B.2	عبوات بلاستيكية						
X3.B.3	أدوات صحية وبرابيج وأنابيب						
X3.B.4	أدوات منزلية						
X3.B.5	أدوات طبية						
X3.B.6	فرشات وإسفنج صناعي						
X3.B.7	أثاث (طاولات، كراسي)						
X3.B.8	تجهيزات بناء						
X3.B.9	ألعاب						
X3.B.10	منتجات أخرى، حدد:						
X3.B.11	منتجات أخرى، حدد:						
X3.B.12	منتجات أخرى، حدد:						

X3.C	ج. نسبة توزيع المبيعات والصادرات للمنشأة من مجمل الإنتاج في الدول والاسواق التالية خلال آخر ثلاث سنوات حسب المنتجات التالية (نسبة)						
	السوق / المنتج	الضفة الغربية	قطاع غزة	إسرائيل	الأردن	باقي الدول العربية	الدول الأجنبية
		W.B	G.S	IL	JR	A.C	F.C
X3.C.1	أكياس النايلون						
X3.C.2	عبوات بلاستيكية						
X3.C.3	أدوات صحية وبرابيج وأنابيب						
X3.C.4	أدوات منزلية						
X3.C.5	أدوات طبية						
X3.C.6	فرشات وإسفنج صناعي						
X3.C.7	أثاث (طاولات، كراسي)						
X3.C.8	تجهيزات بناء						
X3.C.9	ألعاب						
X3.C.10	منتجات أخرى، حدد:						
X3.C.11	منتجات أخرى، حدد:						
X3.C.12	منتجات أخرى، حدد:						

X4	4. تطور عدد المنتجات خلال آخر ثلاث سنوات (عدد المنتجات أو الأصناف لكل نوع بالأرقام)						
	المنتج	العدد			زيادة	نقصان	لا يوجد تغيير
		2012	2013	2014			
X4.A.1	أكياس النايلون						
X4.A.2	عبوات بلاستيكية						
X4.A.3	أدوات صحية وبرابيج وأنابيب						
X4.A.4	أدوات منزلية						
X4.A.5	أدوات طبية						
X4.A.6	فرشات وإسفنج صناعي						
X4.A.7	أثاث (طاولات، كراسي)						
X4.A.8	تجهيزات بناء						
X4.A.9	ألعاب						
X4.A.10	منتجات أخرى، حدد:						
X4.A.11	منتجات أخرى، حدد:						
X4.A.12	منتجات أخرى، حدد:						

X5.A	5. ا - عدد المنتجات التي تم تطويرها أو تغيير شكلها من حيث الإنتاج أو الخصائص (بالأرقام)						
	المنتج	العدد			زيادة	نقصان	لا يوجد تغيير
		2012	2013	2014			
X5.A.1	أكياس النايلون						
X5.A.2	عبوات بلاستيكية						
X5.A.3	أدوات صحية وبرابيج وأنابيب						
X5.A.4	أدوات منزلية						
X5.A.5	أدوات طبية						
X5.A.6	فرشات وإسفنج صناعي						
X5.A.7	أثاث (طاولات، كراسي)						
X5.A.8	تجهيزات بناء						
X5.A.9	ألعاب						
X5.A.10	منتجات أخرى، حدد:						
X5.A.11	منتجات أخرى، حدد:						
X5.A.12	منتجات أخرى، حدد:						

X5.B	5. ب - عدد المنتجات التي تم تغيير أو تطوير طريقة إنتاجها دون تغيير شكلها أو جوهرها (بالأرقام)						
	المنتج	العدد			زيادة	نقصان	لا يوجد تغيير
		2012	2013	2014			
X5.B.1	أكياس النايلون						
X5.B.2	عبوات بلاستيكية						
X5.B.3	أدوات صحية وبرابيج وأنابيب						
X5.B.4	أدوات منزلية						
X5.B.5	أدوات طبية						
X5.B.6	فرشات وإسفنج صناعي						
X5.B.7	أثاث (طاولات، كراسي)						
X5.B.8	تجهيزات بناء						
X5.B.9	ألعاب						
X5.B.10	منتجات أخرى، حدد:						
X5.B.11	منتجات أخرى، حدد:						
X5.B.12	منتجات أخرى، حدد:						

* الرجاء الإجابة بوضع إشارة (×) داخل الخانة التي ترونها مناسبة						
	العبارة	موافق بشدة	موافق	محايد	معارض	معارض بشدة
X6	**5. تقييم نتائج تغيير وتطوّر المنتجات و طرق الإنتاج في مصنعكم**					
X6.1	انتاج منتجات جديدة باستمرار من أولويات الشركة					
X6.2	تقوم الشركة بتطوير طرق الإنتاج					
X6.3	تقوم الشركة بتحسين طرق الإنتاج					
X6.4	تتعامل الشركة بسرعة مع متطلبات السوق بإنتاج منتجات جديدة					
X6.5	تعدل الشركة بشكل مستمر في تصاميم منتجاتها للدخول الى أسواق جديدة					
X6.6	تهتم شركتكم باستخدام آليات جديدة في العمل لتقليل التكلفة					
X6.7	تستخدم الشركة التكنولوجيا الحديثة في عملية الإنتاج					
X6.8	تهتم الشركة باستخدام اساليب جديدة في التسويق					
X6.9	تهتم الشركة باستخدام اساليب جديدة إدارة الشركة					
X7	**6. الأفكار الجديدة والإبداعية داخل الشركة**					
X7.1	تهتم شركتكم بإنتاج منتجات جديدة باستمرار لم يقم غيركم بصنعها في أي وقت مضى					
X7.2	تقوم شركتكم باستمرار بتطوير المنتجات من حيث الشكل					
X7.3	تقوم شركتكم باستمرار بتطوير منتجات تقلل من نسبة التكلفة					
X7.4	تهتم الشركة باستخدام اساليب جديدة في الإنتاج					
X7.5	تحفز شركتكم موظفيها على تطوير المنتجات					
X7.6	توجه شركتكم الموظفين نحو تطوير طرق الإنتاج					
X8	**7. المعرفة والمعلومات للشركة**					
X8.1	تهتم الشركة بالبحث والتطوير في عملها					
X8.2	تقوم الشركة باجراء تطوير أو اختبار على المنتجات					
X8.3	تقوم الشركة باجراء تطوير أو اختبار على طرق الإنتاج					
X8.4	الشركة تهتم بإجراء تدريب للموظفين					
X8.5	الشركة تهتم بتطوير مهارات الموظفين					
X8.6	تهتم الشركة باستخدام الآلات والبرمجيات المتطورة					
X8.7	تهتم الشركة باستخدام مواد أو مدخلات وسيطة متطورة في عملية الإنتاج					
X8.8	تهتم الشركة بتبادل المعلومات والخبرات بين الموظفين					
X8.9	تقوم الشركة بالاتصال بالزبون لتلبية احتياجاته					
X8.10	تقوم الشركة بالاتصال بالزبون من أجل تحسين المنتجات					
X8.11	تقوم الشركة بالإتصال بالزبون من أجل الحصول على التغذية الراجعة (معلومات حول المنتجات)					
X8.12	تقوم الشركة بالإطلاع على نتائج الأبحاث والمنشورات العلمية و تقارير الخبراء					
X8.13	تهتم الشركة بشراء المعلومات التقنية من أجل تطوير الإنتاج أوإنتاج منتجات جديدة					
X8.14	تهتم الشركة بشراء المعلومات التقنية من أجل تطوير طرق الإنتاج					
X8.15	تقوم شركتكم بتدريب الطاقم خارج البلاد (فلسطين)					
X8.16	شركتكم تهتم بإرسال موظفيها لمختلف الحلقات الدراسية وورش العمل والمؤتمرات في الداخل والخارج					
X9	**8. الروابط الداخلية والخارجية للشركة**					
X9.1	تقوم شركتكم بالتعاون مع الشركات الأخرى أوالجامعات أو مؤسسات البحث العلمي في عملية التطوير					
X9.2	تهتم شركتكم بالعضوية في المؤسسات أو الغرف التجارية أو الإتحادات الصناعية					
X9.3	تشارك الشركة في المعارض الخارجية أو الداخلية أوالندوات					
X9.4	تهتم شركتكم بإنشاء شبكات وعلاقات خارجية مع المنافسين					

ملاحظات ترونها مناسبة:

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	العبارة	موافق بشدة	موافق	محايد	معارض	معارض بشدة
X9.5	تهتم شركتكم ببناء علاقات مع الزبائن والموردين					
X9.6	تهتم الشركة بعمل شراكة وتواصل بين الموظفين المدراء					
X9.7	يهتم مدراء الشركة أو الأقسام ببناء علاقات جيدة مع الموظفين					
X9.8	يتخذ المدراء و المسؤوليين القرارات المهمة من مجلس الإدارة أو الأصحاب بشأن المعومات والمعرفة					
X10	**9. البيئة و الثقافة الإبداعية للشركة**					
X10.1	تهتم الشركة بمكافأة الموظفين المبدعين					
X10.2	تقوم الشركة بمعاقبة الموظفين والأفراد اللذين تتدنى إنتاجيتهم					
X10.3	تشجع الشركة موظفيها على تطوير منتجات جديدة					
X10.4	الشركة تشجع الموظفين على تطوير طرق الإنتاج					
X10.5	تشجع الشركة الموظفين على التعلم وتطوير المهارات					
X10.6	بيئة الشركة تحفز الموظفين على تطوير اساليب التسويق					
X11	**10. معيقات تطوير أعداد المنتجات و اساليب الإنتاج**					
X11.1	تكلفة تطوير منتجات جديدة					
X11.2	تكلفة تطوير اساليب (طرق) الإنتاج					
X11.3	تعاني الشركة من صعوبة تسويق السلع الجديدة					
X11.4	تعاني الشركة من صعوبة تطوير اساليب التسويق					
X11.5	تؤثر الإجراءات القانونية والضرائب والتشريعات على عملية التطوير					
X11.6	يؤثر الوضع الإقتصادي في فلسطين على تطوير اعداد المنتجات					
X11.7	يؤثر الوضع الإقتصادي في فلسطين على تطوير اساليب الانتاج					
X11.8	يؤثر الوضع الإقتصادي في فلسطين على عدم توفر ميزانية وتمويل					
X12	**11. الأداء الاداري للشركة**					
X12.1	تتمتع الشركة بعلاقات جيدة مع موردي المواد الخام أو المواد الوسيطة					
X12.2	تتمتع الشركة بعلاقات جيدة مع موزعي منتجاتها					
X12.3	يتمتع الموظفون بدرجة عالية من التكيف مع بيئة الشركة					
X12.4	يتمتع الموظفون بقدرة عالية من التعلم					
X13	**12. الشركة أفضل من منافسيها بالنسبة لـ**					
X13.1	سرعة الاستجابة لاحتياجات الزبائن الجديدة					
X13.2	القدرة على تطوير منتجات / خدمات تلبي احتياجات الزبائن					
X13.3	سرعة الدخول لأسواق جديدة					
X13.4	معدل عرض منتجات / خدمات جديدة في السوق					
X14	**13. أداء الشركة لديكم**					
X14.1	حقق لكم أرباح جيدة					
X14.2	حقق لكم نمو سريع					
X14.3	حسن من قدراتكم التنافسية					
X14.4	عزز من موقعكم الإستراتيجي					
X14.5	قد زاد بشكل ملحوظ من حصتكم في السوق					

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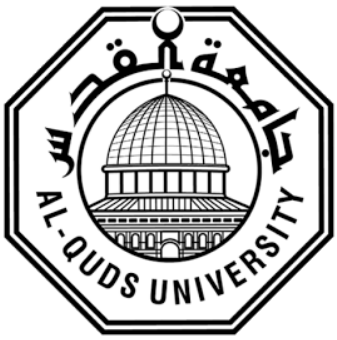
شكرا لتعاونكم .....

Appendix 2: the questionnaire in English



College of Graduate Studies

Institute of Business & Economics

This study will examine the prospects of product and innovations in your firm. Your cooperation in answering this questionnaire will help us to obtain the results that could benefit your firm in identifying and developing the plastic industry. Information from this questionnaire will be used only for the purpose of scientific research and we will deal with it confidentially.

The Researcher: Farid Mukarker

X1	**1. General Information**								
X1.1	**Name of the Firm:**		X1.2	**District:**		X1.3	**Year of establishment :**		
X1.4	**Firm owner previous profession :**	1.	□ Related to current business	X1.5	**Firm owner. Educational level:**	1.	□Preparatory	4.	□Secondary
		2.	□ Not Related to current business			2.	□Diploma	5.	□Bachelor
						3.	□MA	6.	□Ph.D.
X1.6	**Legal entity:**	1.	□ Sole Proprietorship						
		2.	□ Partnership (Normal Company)						
		3.	□ Public Shareholding Company						
		4.	□ Private Shareholding Company						

X1.7	**Changes in the number of machines during the last 3 years**	**2012**	**2013**	**2014**	X1.8	**Cost of machines (U.S dollars):**	
		X1.7.1	X1.7.2	X1.7.3			

X1.9	**Source of Machines & equipment (Country):**	X1.9.1	□Europe	X1.9.2	□China
		X1.9.3	□Other Asian Countries	X1.9.4	□America
		X1.9.5	□Israel	X1.9.6	□Arab Countries
		X1.9.7	□Other, Specify:		

X1.10	**The number of employees during the last 3 years**	**2012**	**2013**	**2014**
		X1.10.1	X1.10.2	X1.10.3

X1.11	**Set of products produced by the firm**	X1.11.1	Plastic Bags	X1.11.2	Plastic Boxes	X1.11.3	Sanitary ware and pipes
		X1.11.4	Houseware	X1.11.5	Medical tools	X1.11.6	Foam & mattresses
		X1.11.7	Furniture	X1.11.8	Construction & building	X1.11.9	Toys
		X1.11.10	Disposables	X1.11.11	Recycled Plastics	X1.11.12	Other

X1.12	The firm sell its products directly to	X1.12.1	□ Customers	X1.12.2	□ wholesalers	X1.12.5	□ subcontractors
		X1.12.3	□ Retailers	X1.12.4	□ exporting		

X2	**2. This section contains questions about product & production processes**						
X2.A	**During the last three years, the market share of the following products were:**	**Increasing Substantially**	**Increasing Somewhat**	**Not Changed**	**Decreasing somewhat**	**Decreasing Substantially**	**Don't produce**
X2.A.1	Plastic Bags						
X2.A.2	Plastic Boxes						
X2.A.3	Sanitary Ware & Pipes						
X2.A.4	Housewares						
X2.A.5	Medical tools						
X2.A.6	Foam & Mattresses						
X2.A.7	Furniture						
X2.A.8	Construction & building						
X2.A.9	Toys						
X2.A.10	Recycled Plastics						
X2.A.11	Disposable						
X2.A.12	Other						
X2.B	**B. During the last three years, the annual sales of the following**	**Increasing Substantially**	**Increasing Somewhat**	**Not Changed**	**Decreasing somewhat**	**Decreasing Substantially**	**Don't produce**
X2.B.1	Plastic Bags &						
X2.B.2	Plastic Boxes						
X2.B.3	Sanitary Ware & Pipes						
X2.B.4	Housewares						
X2.B.5	Medical tools						
X2.B.6	Foam & Mattresses						
X2.B.7	Furniture						
X2.B.8	Construction & building						
X2.B.9	Toys						
X2.B.10	Recycled Plastics						
X2.B.11	Disposable						
X2.B.12	Other						
X2.C	**C. During the last three years, the annual profits of the following products were:**	**Increasing Substantially**	**Increasing Somewhat**	**Not Changed**	**Decreasing somewhat**	**Decreasing Substantially**	**Don't produce**
X2.C.1	Plastic Bags tools						
X2.C.2	Plastic Boxes						
X2.C.3	Sanitary Ware & Pipes						
X2.C.4	Housewares						
X2.C.5	Medical tools						
X2.C.6	Foam & Mattresses						
X2.C.7	Furniture						
X2.C.8	Construction & building						
X2.C.9	Toys						
X2.C.10	Recycled Plastics						
X2.C.11	Disposable						
X2.C.12	Other						

X3	1. Distribution of sales and exports during the last three years (U.S Dollars)						
X3.A	**A. During the last three years, export of the following products had:**	**Increasing Substantially**	**Increasing Somewhat**	**Not Changed**	**Decreasing somewhat**	**Decreasing Substantially**	**Don't produce**
X3.A.1	Plastic Bags						
X3.A.2	Plastic Boxes						
X3.A.3	Sanitary Ware &Pipes						
X3.A.4	Housewares						
X3.A.5	Medical tools						
X3.A.6	Foam & Mattresses						
X3.A.7	Furniture						
X3.A.8	Construction & building						
X3.A.9	Toys						
X3.A.10	Recycled Plastics						
X3.A.11	Disposable						
X3.A.12	Other						
X3.B	**B. During the last three years, the number of external markets for the following products were:**	**Increasing Substantially**	**Increasing Somewhat**	**Not Changed**	**Decreasing somewhat**	**Decreasing Substantially**	**Don't produce**
X3.B.1	Plastic Bags tools						
X3.B.2	Plastic Boxes						
X3.B.3	Sanitary Ware & pipes						
X3.B.4	Housewares						
X3.B.4	Medical tools						
X3.B.5	Foam & Mattresses						
X3.B.6	Furniture						
X3.B.7	Construction & building						
X3.B.8	Toys						
X3.B.9	Recycled Plastics						
X3.B.10	Disposable						
X3.B.11	Other						
X3.B.12	Plastic Bags &						
X3.C	**C. Please fill in the percentage of sales distribution and exports from total production in the following markets during the last three years:**						
	The Market / The Product	**West Bank**	**Gaza Strip**	**Israel**	**Arab Countries**	**Foreign Countries**	
X3.C.1	Plastic Bags						
X3.C.2	Plastic Boxes						
X3.C.3	Sanitary Ware & Pipes						
X3.C.4	Housewares						
X3.C.5	Medical tools						
X3.C.6	Foam & Mattresses						
X3.C.7	Furniture						
C3.C.8	Construction & building						
C3.C.9	Toys						
C3.C.10	Recycled Plastics						
C3.C.11	Disposable						
C3.C.12	Other						

X4	Please state the number of products that have been produced for each category, during the last three years						
	The Product	Number			Increase	Decrease	No Change
		2012	2013	2014			
X4.1	Plastic Bags & Packaging						
X4.2	Plastic Boxes						
X4.3	Sanitary Ware & Pipes						
X4.4	Housewares						
X4.5	Medical tools						
X4.6	Foam & Mattresses						
X4.7	Furniture						
X4.8	Construction & building						
X4.9	Toys						
X4.10	Recycled Plastics						
X4.11	Disposable						
X4.12	Other						

X5.A	5. A. Please state the number of products that had been developed in terms of shape and characteristics						
	The Product	Number			Increase	Decrease	No Change
		2012	2013	2014			
X5.A.1	Plastic Bags & Packaging tools						
X5.A.2	Plastic Boxes						
X5.A.3	Sanitary Ware & Pipes						
X5.A.4	Housewares						
X5.A.5	Medical tools						
X5.A.6	Foam & Mattresses						
X5.A.7	Furniture						
X5.A.8	Construction & building equipment						
X5.A.9	Toys						
X5.A.10	Recycled Plastics						
X5.A.11	Disposable						
X5.A.12	Other						

X5.B	5.B Please state the number of products that the firm had changed or developed their production methods or processes						
	The Product	Number			Increase	Decrease	No Change
		2012	2013	2014			
X5.B.1	Plastic Bags & Packaging tools						
X5.B.2	Plastic Boxes						
X5.B.3	Sanitary Ware & Pipes						
X5.B.4	Housewares						
X5.B.5	Medical tools						
X5.B.6	Foam & Mattresses						
X5.B.7	Furniture						
X5.B.8	Construction & building equipment						
X5.B.9	Toys						
X5.B.10	Recycled Plastics						
X5.B.11	Disposable						
X5.B.12	Other						

X6	6.Evaluate the results of product or process innovation in your firm					
The Phrase		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
X6.1	One of the firm's priorities is to develop new products					
X6.2	The firm develops its own production methods					
X6.3	The firm improves its own production methods					
X6.4	The firm produces new products quickly according to the					
X6.5	The firm continuously adjusts the design of their products to enter new markets.					
X6.6	The firm is interested in using new mechanisms at work to reduce the production cost.					
X6.7	The firm is interested in using the modern technology in the production process.					
X6.8	The firm is interested in using new marketing methods					
X6.9	The firm is interested in using new managerial methods					
X7	**7. The firm's new and creative ideas**					
X7.1	The firm is always interested in producing new products that others didn't produce					
X7.2	The firm continuously develops its products in terms of					
X7.3	The firm continuously improves its production processes that reduce production cost					
X7.4	The firm is interested in using new methods to reduce the production cost.					
X7.5	The firm stimulates its staff toward developing the firm's					
X7.6	The firm steers its employees toward developing new production methods					
X8	**8. The firm's knowledge & information**					
X8.1	The firm is concerned about the research and development					
X8.2	The firm conducts development and testing on its products					
X8.3	The firm conducts development and testing on its production methods					
X8.4	The firm is interested in training its staff					
X8.5	The firm is interested in enhancing its staff to acquire new					
X8.6	The firm is interested in using sophisticated machinery and software					
X8.7	The firm is interested in using intermediate and advanced inputs in the production processes					
X8.8	The firm is interested in exchanging information and experience among staff					
X8.9	The firm obtains information from its customers to meet their needs					
X8.10	The firm obtains information from customers to improve its products					
X8.11	The firm takes feedback from its customers and suppliers					
X8.12	The firm is concerned about making use of external research results					
	The firm is interested in purchasing and acquiring technical information to develop new products					
X8.13	The firm is interested in purchasing and acquiring technical information to develop the production processes					
X8.14	The firm is interested in training its staff abroad					
X8.15	The firm is interested in sending its employees to various local and abroad seminars, workshops, and conferences.					
X9	**9. Internal and external linkages**					
X9.1	The firm collaborates with other companies, universities or scientific research institutions to develop its					
X9.2	The firm is concerned about its membership in commercial and scientific organizations, chambers of					
X9.3	The firm participates in foreign exhibitions and seminars					

The Phrase		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
X9.4	The firm builds networks and external relationships with its competitors					
X9.5	The firm establishes relationships with its customers and suppliers					
X9.6	The firm makes partnership and communication networks between its managers and the staff					
X9.7	The firm's departments managers have good relations with the staff					
X9.8	Managers discuss and take into consideration feedback, useful ideas from the board and staff members					
X10	**10. environment and creative culture of the firm**					
X10.1	The firm rewards its creative employees					
X10.2	The firm punishes it low-productivity employees					
X10.3	The firm encourages its employees toward developing new products					
X10.4	The firm encourages its employees toward developing new production methods					
X10.5	The firm encourages its employees to learn and develop their skills					
X10.6	The firm's environment encourages employees to develop new marketing methods					
X11	**11. The obstacles and challenges of developing new products and processes**					
X11.1	Developing new products is very costly					
X11.2	Developing production methods or processes is very					
X11.3	The firm suffers from marketing its new products					
X11.4	The firm cannot develop new marketing methods					
X11.5	Legal procedures and tax legislation influence the firm's development process					
X11.6	The economic situation in Palestine influences the development of new products					
X11.7	The economic situation in Palestine influences the process of developing new production methods					
X11.8	Under the economic situation in Palestine, your business lacks sufficient budget and finance					
X12	**12. The firm's administrative/organizational performance**					
X12.1	The firm has good relations with its suppliers of raw or intermediate materials					
X12.2	The firm has good relations with its distributors					
X12.3	Employees enjoy a high degree of adaptation to the firm's environment					
X12.4	The firm's staff have high ability to learn					
X13	**13. Our firm is better than competitors in relation to:**					
X13.1	The speed of response to new customer needs					
X13.2	The ability to tailor products to individual customer needs					
X13.3	The speed in entering new markets					
X13.4	The rate of introduction of new products/services					
X14	**14. The performance of our firm:**					
X14.1	Had been very profitable					
X14.2	Had achieved rapid growth					
X14.3	Had improved its competitiveness					
X14.4	Had strengthened its strategic position					
X14.5	The firm had significantly increased its market share					

الإبتكار على المنتجات وطرق الإنتاج في صناعة البلاستيك الفلسطينية

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ملخص:

نتيجة للتطور التكنولوجي السريع في هذا العصر القائم على المعرفة، ولأن الابتكار هو المصدر الرئيسي للميزة التنافسية والتنمية، فمن الضروري جدا أن يتم تطوير الاقتصاد الفلسطيني من خلال تطوير القطاع الصناعي وإزدهاره. ولأن الابتكار هو العامل الرئيسي للميزة التنافسية، فإن هذه الدراسة تهدف إلى معرفة كيفية تطوير الصناعة الفلسطينية وذلك من خلال تبني الابتكارات عن طريق التركيز على صناعة البلاستيك في الضفة الغربية. ومن أجل تحقيق هذا الهدف لقد قامت هذه الدراسة بدراسة خصائص ومواصفات هذه الصناعة والتي يمكن أن تؤدي إلى الابتكار وتأثيره على مختلف المجالات الإدارية والإقتصادية في الصناعة الفلسطينية.

لقد قامت هذه الرسالة بدراسة الخصائص الرئيسية لصناعة البلاستيك الفلسطينية من خلال أنشطتها . وبالتالي، فيما يتعلق بهذه الخصائص والأنشطة، كان من الضروري تحقيق في دور الابتكار لتطوير هذه الصناعة. وللحصول على صورة كاملة حول كيفية الابتكار داخل المنشآت، لقد وضّح الإطار النظري مفهوم الابتكار من خلال مناقشة المحددات الرئيسية وتأثيره على عدة جوانب إقتصادية وإدارية. فقد تم تقديم شرحا مفصلا لأهم المتغيرات ذات الصلة بعملية الإبتكار مثل الإبداع والمعرفة والروابط والبيئة أوالثقافة الإبداعية للشركة. وقد تم كتابة هذا الإطار النظري اعتمادا على الدراسات التجريبية وغيرها من المصادر المختلفة في عدة دول ومناطق مختلفة من العالم. وبذلك، تم شرح الآثار المترتبة على الابتكار والإبداع وكيف يمكن تحقيق الميزة التنافسية. وعلاوة على ذلك، قدم الإطار النظري فهم جيدا حول علاقة هذه المتغيرات بالإبتكار ومن ثم تم مقارنة نتائج هذه الدراسة مع نتائج الدراسات السابقة.

في هذه الدراسة، لقد تم التركيزعلى نوعين من الابتكار (إبتكار في المنتج والإبتكار في طرق الإنتاج) من أجل التوصل إلى صورة واضحة حول عملية الابتكار، حيث تم استخدام تعريفات بسيطة وشائعة عن الابتكار لتكون مفهومة من قبل أصحاب الشركات ويمكن تطبيقها على الصناعة الفلسطينية.

لقد تم استخدام الاستبيان والمقابلة لإتمام هذه الدراسة. فقد تم جمع البيانات من شركات البلاستيك "اللدائن" في الضفة الغربية، حيث تم اتباع النهج الكمي والنوعي من أجل مواصلة استكشاف خصائص وسمات شركات البلاستيك بشكل عام. فقد ركز الاستبيان على المنتج وعملية الابتكار بالإضافة إلى التغييرات في عدد المنتجات، والحصة السوقية والمبيعات والأرباح والصادرات وعدد الأسواق الخارجية من أجل تحديد التغير الفعلي خلال السنوات الثلاث الماضية (2012 – 2014). لقد تم توزيع الاستبيان على عينة من شركات البلاستيك الفلسطينية في الضفة الغربية (N = 53)، و نظرا لصغر حجم المجتمع لقد حاولت الدراسة أن تشمل جميع المنشآت البلاستيكية في الضفة الغربية. فقد تم الإستدلال على اسماء ومواقع المنشآت البلاستيكية من خلال اجراء اتصالات مع الغرف التجارية في مختلف أنحاء الضفة الغربية.

وقد وجدت هذه الدراسة أن الإبداع والمعرفة والروابط هي عوامل مهمة لحدوث الإبتكارات، وكما وجد أيضا أن حجم الشركة عاملا محددا للابتكار. بالإضافة إلى ذلك، وجد أن للابتكار تأثير إيجابي على جوانب مختلفة مثل الصادرات وفرص العمل والأداء والميزة التنافسية. وعلاوة على ذلك، وجد الابتكار يتأثر بالعوامل أخرى كمواصفات وخصائص الشركة مثل حجم الشركة. وأيضا لقد استنتجت هذه الدراسة أن شركات البلاستيك الفلسطينية في الضفة الغربية ليسوا على دراية بالابتكار وأهميته في تحقيق النمو وتعزيز القدرة التنافسية. وعلاوة على ذلك، أظهرت معظم المنشآت البلاستيكية أن الاهتمام الرئيسي لها هو الحد من تكاليف إنتاجها من أجل المنافسة في الأسواق المحلية والخارجية. وهكذا، فقد وجد أن لمنشآت البلاستيك في الضفة الغربية نية أكبر في تطبيق الإبتكارات على طرق الإنتاج من الابتكارات في المنتجات. وبالإضافة إلى ذلك، فإن المنشآت البلاستيكية ما تزال تعمل على الأساليب التقليدية نتيجة افتقارها للتمويل اللازم للاستثمار في الآلات والمعدات الحديثة.

بناءا على نتائج الدراسة لقد توصلت الدراسة إلى عدد من التوصيات وأهمها: أن على الغرف التجارية والاتحادات الصناعية أن يبينوا للشركات أهمية الابتكار ودوره الفعال في نمو هذه الصناعة. وعلاوة على ذلك، ينبغي على منشآت البلاستيك توسيع معرفتهم وتدريب القوى العاملة لديهم من أجل إثراء الموظفين بالمعلومات والمهارات اللازمة والمفيدة. بالإضافة إلى ذلك، يجب على مدراء منشآت البلاستيكية أن يقوموا بتغير النظام الحالي وبيئة العمل البيروقراطية وتعزيز الروابط مع الجامعات والمؤسسات العلمية من خلال خلق التدريب المتبادل والبرامج المشتركة بجانب البحث والتطوير.

فقد توصي الدراسة أيضا أنه يجب الجامعات الفلسطينية إنشاء برامج تدريبية للطلاب في المجالات العلمية والهندسية، وضرورة إنشاء مراكزللبحث ومؤسسات للبحث العلمي. بالإضافة إلى ذلك يجب على الحكومة الفلسطينية أن تزيد من إنفاقاتهاعلى البحث العلمي ودعم الصناعة والاستثمار عن طريق الحد من الإعفاءات الضريبية والجمركية، ويجب أن تكون مسؤولة عن سياسة البحث العلمي من أجل تحسين التنسيق بين الجهات الفاعلة السياسية، بما في ذلك الوزارات السيادية الكبرى مثل وزارة الثقافة، التعليم العالي ووزارة الاقتصاد.