



SCHOOL OF
ECONOMICS AND
MANAGEMENT

Master's Programme in Innovation and Global Sustainable Development

How production offshoring impacts process innovation in the home country

GKN and Embraco case studies in Italy

by

Alessandro Maffei (al4108ma-s@student.lu.se)

This thesis investigates how offshoring influences process innovation in the home country. This topic, although stimulating, has been understudied in the past by academia. I have elaborated two innovative hypotheses according to which relocations would hurt process innovation in the home country because 1) they are used as an alternative to process innovation, and 2) they damage trade-unions. To explore them, I have analyzed two case studies from Italy, the Embraco plant of Riva di Chieri (Piedmont) and the GKN plant of Campi Bisenzio (Tuscany). Both are representative of the Italian economy due to historical, industrial, and geographic reasons. Methodologically, I have conducted nine semi-structured interviews with different agents connected to the plants. The case studies confirm the two hypotheses. Consequently, the study can push on the research frontier on this issue, showing new ways in which relocations affect process innovation.

Programme Code: EKHS34
Master's Thesis (15 credits ECTS)
June 2022
Supervisor: Olof Ejermo
Examiner: Kristin Ranestad
Word Count: 16 000

Acknowledgements

Many are the people that I would like to thank for this thesis.

First, I want to express my gratitude to my supervisor, Olof Ejermo, who supported me with good and important advice and a lot of patience. The kindness and enthusiasm with which he followed my work is something that I have really appreciated and that I will remember.

Secondly, there are my mother, my father, my brother, and my two grandmothers, whose moral support is always important, although I am far from them.

In Lund, I would like to thank Nerea for being a real and good friend; Arnaldo and Paolo, because they reminded me of Italy when I needed it; Anja, because without her I would have missed a lot of classes, and the housemates of my girlfriend (including Francis the cat) because I wrote most of this work in their home and they always gave me hospitality with generosity.

Finally, I would like to thank my beloved Annina because she has trusted in me and encouraged me in the most complicated moments.

This thesis would not have been possible without the interviewees. A special thank goes to the workers of GKN and Embraco, to which this thesis is dedicated.

Table of Contents

1	Introduction	2
1.1	Aim of the thesis, definitions, and methodology	2
1.2	Outline of the thesis and contribution	4
2	Theory	6
2.1	Literature review	6
2.1.1	Positive impact studies	6
2.1.2	Negative impact studies	9
2.1.3	General overview	10
2.2	Theoretical Framework	10
2.2.1	Introduction to the hypotheses	10
2.2.2	<i>Hypothesis 1: Labour-saving hypothesis</i>	11
2.2.3	<i>Hypothesis 2: Trade-unions hypothesis</i>	13
3	Methodology	16
3.1	Level of analysis and qualitative method	16
3.2	Case studies	16
3.3	Historical context	17
3.3.1	First case study: Embraco	18
3.3.2	Second case study: GKN	19
3.4	Interviewees and method	20
4	Results	22
4.1	<i>Hypothesis 1: Labour-saving hypothesis</i>	22
4.2	<i>Hypothesis 2: Trade-unions hypothesis</i>	25
4.3	Discussion	30
4.3.1	<i>Labour-saving hypothesis</i>	30
4.3.2	<i>Trade-unions hypothesis</i>	31
5	Conclusions	33
5.1	Limitations of the study	33
5.2	Final observations	34
	References	36

1 Introduction

Starting from the 1980s, and especially after the end of the Cold War, the de-industrialisation of the West and the offshoring of firms to developing countries has become a crucial factor in the economy (Barbe & Riker, 2018; Wallerstein, 1999). Offshoring entails social, economic, and political implications. For example, Youngdahl and Ramaswamy (2008, p.213) have affirmed that offshoring is “the most important phenomenon transforming the workplace”, while Ebenstein, Harrison, McMillan, & Phillips, (2014, p.581) have sustained that between 1983 and 2002 in the US “6 million jobs were lost in manufacturing, and income inequality increased sharply” because of relocations. Consequently, offshoring has been deeply studied from different perspectives. Despite this attention, offshoring is “seldom explicitly defined in literature” and “[the studies that deal with it] often lack a theoretical framework based on economic theories for argumentation or testing” (Jahns, Hartmann & Balls, 2006, p.218).

1.1 Aim of the thesis, definitions, and methodology

Although the general attention on offshoring, its impact on innovation is extremely understudied by academia. The lack of attention to the link between offshoring and innovation is quite surprising because innovation is one of the keys to the economic process (European Central Bank, 2017; Schumpeter, 1983, Solow, 1956; Bloom, Van Reenen & Williams, 2019). There are at least three reasons why academia produced such a small number of studies that investigate this important link. The first is the vagueness of the concepts. If offshoring is a general term studied in many ways, even more complex is to define innovation. For example, Schumpeter (1983) defined innovation in a far wider way than what contemporary scholars usually do. In addition, the theoretical obscurity of both innovation and offshoring creates practical problems that can hinder their investigation. The lack of a common definition is one of the reasons why “Innovation is difficult to measure” (Vivarelli, 2014, p.131). A second reason that explains this gap in the literature is the small number of appropriate datasets. Both offshoring and innovation datasets exist numerously. Nevertheless, datasets that study the connection between offshoring and innovation are almost non-existent. The final reason is that both offshoring and innovation are deeply affected by indirect factors (industrial relations, labour conditions, political institutions, historical and geographical aspects, etc.), To consider all of them, a very solid theoretical framework would be necessary, and its development can be complex.

Even considering the studies that focus on this topic, the results are not totally satisfying (see Literature Review). To the abovementioned problems of datasets, they usually add some methodological limits (e.g., they only use quantitative methods, ignoring many aspects that can be traced only through qualitative studies) (Barba Navaretti & Falzoni, 2004; Castellani & Pieri,

2013; Dachs, Ebersberger, Kinkel, & Som, 2015; Mazzanti, Montresor, & Pini, 2009; Mihalache, Jansen, Van Den Bosch, & Volberda, 2012) and they sometimes assume some links that are not automatic (e.g., they take for granted that more profits for the company will inevitably be converted into more technological investments in the home country, although this cannot be proved) (Grossman & Rossi Hansberg, 2006; Markusen, 2002; Valle, García & Avella, 2015).

To sum up, the connection between offshoring and innovation is a relevant topic, but it has been only rarely studied up to now. The previous studies on this topic have uncertain results. All these reasons have pushed me to investigate this topic. *The purpose of this thesis is to explore the impact of offshoring on process innovation in the home country.*

A pre-requirement to investigate this topic is a clear definition of what I mean by these two terms. In the present paper, I will talk of *offshoring* as the total or partial relocation of the production and manufacturing process implemented by a company. Obviously, other parts of the business process could be offshored (e.g., R&D), but the focus of this thesis will be on manufacturing ones. When I will refer to other phases of the business process, I will explicitly indicate them. On the other hand, following Vivarelli (2015), we could divide between *product innovation*, which is the introduction of a new product onto the market, and *process innovation*, a change in the organisational structure of production (usually, the introduction of new machinery) to save inputs. In this thesis, I will only focus on process innovation. I took this decision because I thought that including product innovation the study would have become too loose to be handled in few pages.

Offshoring can be led by different reasons according to the different phases of the production. The so-called Smile Curve (Baldwin, 2018) sustains that the most profitable part of the production in nowadays economy would be at the two extremes of the process (at the beginning, like conception and R&D, or at the end, like marketing). On the opposite, the manufactory, in the middle of the value chain, would have an increasingly lower added value. To use the words of Baldwin (2018, p.154), “Much of the value addition that used to happen in fabrication stages... has been transferred to the pre-and post-fabrication stages that are dominated by service inputs”. Therefore, offshoring and process innovations in manufactory phases are increasingly led by the goal of cutting costs. Due to the shift of added value to the extreme parts of the production, cutting costs is increasingly the main strategy to extract profits from the manufacturing process. “The fabrication stages are losing value since they are being commoditized and shifted to lost-cost [sic] locations in developing nations” (Baldwin, 2018, p.155). This is particularly relevant in Europe: “The most frequent motive for offshoring in European countries manufacturing are reductions in labour costs” (Dachs, Borowiecki, Kinkel, & Schmall, 2012, p.11)

Reading the previous works about the impact of offshoring on innovation (see Literature Review and Theory), I have elaborated two new hypotheses. I called them the *Labour-saving hypothesis* and the *Trade-unions hypothesis*. Both sustain that offshoring has a negative impact on process innovation in the home country and both are focused on the role of workers. In this thesis, I have tried to investigate if they are supported by facts or not.

To do so, I have used a qualitative method that I have applied to two case studies of the Italian industry. I have conducted semi-structured interviews with trade-unionists, experts, and a manager. I chose to use a qualitative method because I considered it more appropriate to investigate two case studies. Then, it permitted me to detect some aspects that are not observable through quantitative studies, like the strategies of the two companies. In addition to that, as I already said, the datasets that study the link between offshoring and innovation are very few, and I did not find a proper one to study its impact at the national level. On the opposite, the two firms that I have chosen are well-representative of the Italian economy. They are the Embraco of Riva di Chieri¹ (Piedmont), which produced compressors, and the GKN of Campi Bisenzio (Tuscany), which produced driveshafts. They are emblematic of the Italian economy because they are old firms which are part of two historical sectors of the country: household appliances and automotive. In the period between 1951 and 1963, the Italian GDP grew at an average of 5,9% and the annual GDP per capita more than doubled (from 14 9000 lire per year to 31 261 lire) (Treccani, 2021). In that period, Italy specialised in the production of household appliances (the production of fridges passed from 370 000 unities per year in 1951, to 3 200 000 in 1967) and cars (from 100 000 unities in 1950 to more than one million unities in 1963) (Treccani, 2021). In the next decades, many of the firms that were part of these sectors have offshored their production. Then, both Tuscany and Piedmont are crucial productive and manufactory regions of Italy. Finally, both the plants were part of FIAT, the biggest economic group in the country. For all these reasons, these two firms can be considered representative of the Italian industry. In addition to that, compressors and driveshafts are two goods in which there is very little product innovation, but almost exclusively process one. In this way, I could eliminate the potential impact of product innovation, which, as I said, I was not interested to investigate in this thesis.

1.2 Outline of the thesis and contribution

The organisation of the thesis is the following. In the Literature Review I will analyse both the texts that found a negative and a positive impact of offshoring on innovation, trying to underline their strong points and their weaknesses. Then, in the Theoretical Framework, I will report two hypotheses which focus on how relocations can impact on process innovation. In the successive chapter, called Methodology, I will explain the historical background of the two case studies, the method that I have used and a list of the interviewees that permitted me to investigate the

¹ From now, referred to as Riva

two case studies and so to explore the two hypotheses. In the Results, I will report the outcomes of the interviews and connect them to the theory. In the Conclusions I will indicate the main limitations of my research and I will make some final observations.

I am convinced that this thesis could push on the *research frontier* in the debate about offshoring's impact on innovation. In this sense, two are the main contributions that my work can give. The first one is methodological. Only few papers in this debate have used qualitative methods, and none of them has used some case studies. Nevertheless, for the abovementioned limits of the existing dataset, the potentialities of qualitative methods and case studies should be reconsidered. In addition, the use of interviews has proved to be extremely useful, and it has permitted me to trace some factors that I would have not noted with another method (see Conclusion). The other contribution that this thesis can give is theoretical, and it consists of the two hypotheses that I have elaborated. From what I found, they are new and no previous studies in this debate have ever investigated or proposed them. Almost the totality of studies that found a negative impact of offshoring on innovation has a geographical connotation. For this reason, the introduction of two new hypotheses to explore the topic could be stimulating for this debate.

Consequently, this thesis could result interesting, both on a methodological and theoretical level, for those scholars or researchers that want to investigate the impact of offshoring on innovation. Then, this work could be stimulating for those that are specifically interested in the two case studies (Embraco and GKN). In this sense, I have collected original content that could be helpful for the study of these two firms. Finally, the text could contain some enriching content for those that want to investigate the impact of trade-unions and workers on innovation, like policymakers or trade-unionists, giving them some new arguments and examples.

2 Theory

In the next section, I am going to discuss the qualities and the limits of the previous studies in this debate. It is relevant to note that not all these works focus on process innovation, but most of them generally dealt with innovation. In addition, not all of them focus on the home country, but the majority make a firm-level analysis. Nevertheless, the impact on the home country can be deduced from their theoretical framework and reasoning. After that, I will report the results of some relevant works of the past and how their theories led me to develop two new hypotheses.

2.1 Literature review

As mentioned, the impact of offshoring on innovation in the home country is very neglected in the academic world. It is interesting to note that this is recognised by scholars too. For example, Dachs et al. (2015, p.11) say that "Empirical evidence for the effects of offshoring on innovation is scarce so far". Similarly, "[In the field of studies about offshoring] the effects on R&D in the home country have largely been ignored" (Karpaty & Tingvall, 2015, p.655). "Much less attention has been devoted to the dynamic effects of offshoring on innovation and growth" (Naghavi & Ottaviano, 2009, p.518). "We still know relatively little about how offshoring influences firm-level innovation" (Valle et al., 2015, p.118).

Even considering this niche, the results are ambiguous. There are both studies that support a negative and a positive impact of offshoring on innovation. Dachs et al (2015) report a detailed literature review. I am going to shortly summarize the stances of both groups.

2.1.1 Positive impact studies

Among the studies that found a positive impact of offshoring on innovation, the most relevant work is undoubtedly Kotabe (1990). He conducted a study on US multinational corporations. According to him, the main reason why offshoring would positively affect innovation is the access to new materials, knowledge, and workers' skills. Similarly, Dachs et al. (2015, p.26) say that "We explain this result [the positive impact of offshoring on innovation in the home country] by the changing of specialisation patterns of offshoring firms toward R&D, design, and innovation in the home countries. Moreover, innovation activities in the home country can also benefit... from reverse knowledge spillovers from foreign affiliates to the home country". The study of Mazzanti et al. (2009) confirms these results. Access to new skills and assets is the main positive factor that would fuel an increase in innovation, according to Dunning (1995)

and Shan & Song (1997), and Mihalache et al. (2012) too. Both Barba Navaretti & Falzoni, (2004) and Castellani & Pieri (2013), who focus on Italy, give centrality to positive feedbacks.

Some other works, like Grossman & Rossi Hansberg (2006) maintain that the relocation of manual jobs to developing countries would push Western ones to specialise in innovative sectors. The study of Markusen (2002) about multinational firms supports these results. As previously reported, Dachs et al. sustain a similar position too.

In addition, Valle et al., (2015) note how the saved money could be re-invested into production and innovation, creating a virtuous circle.

To summarise, according to these studies a positive impact of offshoring on innovation in the home country could be explained by at least one of the following mechanisms:

- 1- *New resources mechanism*: thanks to process offshoring, the company has access to new material, knowledge, skills, etc., that will permit to stimulate innovation in the home country too.
- 2- *Specialisation mechanism*: if manufactory sectors are offshored to developing countries, where the cost of labour is inferior, the developed country (as usually home countries are) will be pushed to specialise in high added value sectors and innovative ones.
- 3- *New investment mechanism*: offshoring will permit to increase the profits and save money, which could be invested in new productions in the home country.

These three stances undoubtedly arise some good observations. Nevertheless, there are also some reasons to be sceptical about them.

It is true, as the *new resources mechanism* affirms, that new materials, knowledge, etc. can stimulate innovation. Nevertheless, this process is not automatic. The economic process is not only composed of input and output factors, but it is mainly a social and human phenomenon. Cultural, political, and historical factors can deeply influence (and sometimes hinder) the transfer of goods or ideas from one place to another. Studies from different fields, like the economics of innovation, organisational studies, and political science, show how the transmission of knowledge and feedback can be complicated by aspects like path dependence, group dynamics, and power competition (Castaldi & Dosi, 2006; Graham Allison, 1999; Grossman & Helpman, 2001). Similar aspects have been underlined by evolutionary economic geography too (Iammarino, 2005). It is anything but obvious that communications between a manufacturing firm in a developing country and an R&D laboratory in the West can be easy and smooth (Allen, 1977; Ceci & Prencipe, 2013; Cramton, 2001). Finally, as Valle et al. (2015) note, aside from cultural differences and geographical distance, other problems can be created by institutional and political heterogeneities between countries. For example, the huge differences in a sector like intellectual property rights can deeply affect this transfer process.

The *specialisation mechanism* correctly indicates the possibility of a higher specialisation and division of labour between developing and developed countries. This idea descends, in a certain way, from the Ricardian model of comparative advantages. Nevertheless, this vision assumes a

deep gap between workers' skills in developing and developed countries. In the last two decades, many developing countries have had a sharp increase in education levels, challenging this knowledge gap. For example, almost 1 million engineers graduate every year only in India, and their unemployment rates overcome 75% (Statista, 2021). Therefore, it is not a surprise that more and more high-skilled jobs are offshored too. This is also sustained by academic works that underline how, through offshoring, companies can have access to workers that are not only cheaper, but sometimes highly skilled (Jensen, 2009; Lewin & Peeters, 2006) In addition, it is important to note that, even when these retro-investments happen, this can be the result of political and institutional interventions, more than a natural and inevitable market tendency. The specialisation can be the result of political pressure in the home country on the companies that are offshoring, more than the spontaneous result of market dynamics. For example, in the 2000s FCA (former FIAT) started a general and highly disputed offshoring process. The main goal was to offshore production from Western Europe (especially Italy) to Eastern one (Poland and Slovakia). Nevertheless, between 2009 and 2010, the production of Panda was re-shored from Poland to Pomigliano d'Arco (Italy) (Balcet & Ietto-Gilles, 2020). This was presented by FCA managers as a signal of investments and reshoring of innovative sectors in Italy (Daniele, 2011). Nevertheless, these investments have been implemented only due to the political pressure of the Italian government, not because of FCA's will (Calabrese, 2020, p.166). Finally, more investments do not necessarily mean more innovation. Investments can be led also by non-innovative goals, or innovative projects that do not affect the place in which investments are done, or simply be unsuccessful. For example, a company could buy innovative machinery in one country only because there are free public funds for innovation, but successively offshore them to new plants in a different country. As I will report in the next pages, a similar trend has been observed in the two case studies.

Finally, to deal with the *new investment mechanism*, we can borrow some of the arguments that Vivarelli (2014; 2015) reports about the so-called Compensation Theory. Although Say's law suggests that new profits made in a capitalist economy are immediately converted into new investments, this is doubtful. We cannot know if, when, where, and in which proportion these new investments will be put in place. It could happen after a few years for macroeconomic or strategic reasons (Freeman & Soete, 1987; Pianta, 2005). Then, only a small part could be reinvested. Higher capital for the company does not necessarily entail bigger investments. For example, they could become higher dividends for the shareholders of the company. Even in the case in which all the profits are immediately re-invested, it is everything but automatic that these new investments will be in the home country. A multinational corporation, for example, could decide to invest but in other geographic areas, so the compensatory effect on the home country would be non-existent.

In addition to theoretical problems, these studies have some methodological limitations too. All the studies that I have reported are quantitative. None of them investigate the topic through a qualitative or a mixed method. This reluctance to use non-quantitative methods creates many problems, especially considering, as I said before, that few datasets study the impact of offshoring on innovation in the home country and that definitions of offshoring and innovation are usually ambiguous and heterogeneous. The combination of these two aspects can seriously affect the result of these works. For example, Valle et al. (2015) only had a dataset focused on offshoring, not on innovation. Inevitably, this created many problems to investigate the topic. Their solution was to stretch the theory, using the number of patents as the only indicator for

innovation. In this way, they lost many relevant aspects, like process innovation, non-patented ones, R&D etc. The weakness of a similar approach has been pointed out by Kotabe (1990, pp.627-628), who said that “Patents are not necessarily a good measure of innovation. Patents do not offer the innovator a high level of appropriability since they are increasingly easily invented around by competition without infringing upon the innovator's patent. Also, not all innovations are patented”. Dachs et al (2015, p.11) explicitly sustained that the different results of papers that investigate this topic could be caused by the heterogeneous use of indicators and definition: “The existing contributions show mixed results, which may be explained by the different measurements of innovation employed”. The example just reported of Valle et al. (2015) seems emblematic of it. Obviously, this is a general problem of economics of innovation (if not social sciences in general). Many scholars have maintained it. Vivarelli (2014) notes how the measurement of innovation is extremely complex (see the Introduction). Similarly, Kotabe (1990, p.627) said that “There is empirical difficulty identifying meaningful measures of innovation”.

2.1.2 Negative impact studies

Other studies sustain that offshoring has a negative impact on innovation. As detailedly reported by Dachs et al. (2015), almost all these works focus on the role of feedback and how they would be (negatively) affected by offshoring. Karpaty and Tingvall (2015), through a quantitative study about multinational corporations in Sweden, sustained that offshoring could negatively affect innovation. The classical work of Kline & Rosenberg (1986) maintains that bidirectional feedbacks are crucial to understand process innovation. In this way, it implicitly assumes that an input decrease could reduce innovation too. Other studies (Ketokivi & Ali-Yrkkö, 2009; Leonard-Barton, 1992; Pisano & Shih, 2012) show how experimental practices implemented in the factories can crucially lead to innovation and changes in the production, assuming a negative effect of offshoring on innovation, as Naghavi and Ottaviano (2009) suggest. These studies show how the communication and transfer of skills, knowledge etc. among factories in different countries is a complex process, especially due to heterogeneous cultures, socio-political institutions, and industrial relations. For example, Valle et al. (2015, p.121) note how “innovation involves a high degree of reciprocal interdependence and, consequently, constant communication among all the different business functions and activities”. The widely influential book of Allen (1977) about the diffusion of technological information furnishes a complex framework that underlines how difficult but crucial can communication be to implement innovation, and how this can be damaged by distance. Ceci & Prencipe (2013, p.329) sustain that communication problems and cultural differences could be a crucial obstacle against innovation without the “deployment of ad hoc organizational practices”. Cramton (2001, p.363), in his study on thirteen teams dispersed from a geographical point of view, assumes that mutual knowledge is a “central problem of geographically dispersed collaboration”, fundamental to understanding the innovation process. Finally, as noted, the problem of obstacles is not only connected to culture and communication, but institutions too (Graf & Mudambi, 2005).

As seen, almost all these studies sustain that a negative effect of offshoring on innovation would be caused by geographical and communicative reasons. The reduction of inputs caused by

distance would decrease the stimuli to innovate in the home country. Indeed, they are a sort of specular and opposite version of what I called *new resources mechanism*, which sustained that offshoring would give access to more feedback and inputs. Both the positions have some good points, and it is difficult to establish which of the two approaches is more correct or scientifically solid. In this case too, then, studies that find a negative effect lack a common definition of both innovation and offshoring, and this could affect the results.

2.1.3 General overview

In general, the results of the previous studies are not completely satisfying. Almost all these papers address the topic with quantitative methods, missing some of the aspects that can be traced only through a qualitative one. Both the groups show a vagueness of concepts and definitions that complicates the research. None of the two groups studies the indirect impact that offshoring has on other companies, although this seems relevant. For example, the automotive sector creates five indirect jobs for every direct one (Covarrubias & Perez, 2020). The impact that offshoring has on the five indirect jobs and innovation in the other companies is an important issue, totally ignored by these studies.

The present thesis cannot solve in a totally satisfying way the debate on positive or negative impact, and I think that it is not even imaginable to reach a similar goal in few pages. Nevertheless, I decided to focus on this topic due to a gap in the literature. I am convinced that at least two other hypotheses can be done. They sustain that offshoring would hurt process innovation in the home country. Both are focused on the workers. The first one is connected to the high costs of labour as a driver of innovation, while the second is connected to the role that trade-unions can play to support innovation. To my knowledge, these hypotheses are new, and they have never been analysed in previous studies in this field. Before introducing (and then investigating) them, it is necessary a short theoretical introduction.

2.2 Theoretical Framework

2.2.1 Introduction to the hypotheses

The role of workers (especially blue-collar ones) in the field of economics of innovation is not very studied. Innovation is sometimes perceived as an issue totally disconnected from workers. From this perspective, innovation is presented as something exclusive to engineers, a top-down process in which inventors or engineers plan innovations and workers passively accept them and put them in place. On the opposite, exchanges and feedback between engineers or inventors and manual workers can be important. Blue-collar workers can give feedbacks that are crucial to ameliorate and perfect some innovations, especially process ones (Greve, 2003; Nemeth, 1997; Teece, 1996). For example, Harrisson & Laberge (2002) have underlined that cooperation between workers and managers can be relevant to successfully implementing a process innovation. The two hypotheses that I am going to report sustain that offshoring has a negative

impact on process innovation in the home country. Both are focused on the role of workers and how they can (directly and indirectly) stimulate innovation.

2.2.2 *Hypothesis 1: Labour-saving hypothesis*

Academic world does not have a unanimous idea about which are the factors that drive innovation.

Market opportunities and dynamics are clearly some of them. On the other hand, an important role is played by so-called *negative* or *passive factors*. Vivarelli (2013) has noted how different phases can entail different drivers of innovation. Product innovation, which is indicated by Schumpeter (2010) as the key to the economic competition, is mainly led by market competition, while process innovation is mainly labour-saving (Vivarelli, 2015).

The logic of process innovation is simple. Process innovation is mainly a creative solution to a problem created by the context. Usually, process innovation is labour-saving, so it is aimed at cutting the quantity of work necessary to produce some goods. To put it another way, one of the main drivers that push process innovation is the goal to save money on the cost of workers, and machines or organisational changes are introduced to pursue it (Nübler, 2016). Vivarelli (2015, p.3) says that “Process innovation means producing the same amount of output with less labor (and sometimes other) inputs”.

Labour-saving innovations have played a crucial role in the history of humanity. For example, the contemporary mainstream interpretation of why the Industrial Revolution took place in the UK is connected to labour-saving innovations and high costs of labour (Allen, 2009). According to Allen (2009), the British cost of labour was relatively more expensive than the European one, thus British entrepreneurs had a strong incentive to invest in technological-intensive sectors and labour-saving innovations. Indeed, Allen’s interpretation applies to the British history the theories of Hicks (1963), who indicated the cost of labour as a relevant passive driver of innovation. To use the words of Hicks (1963, p.124): “A change in the relative prices of the factors of production is itself a spur to invention, and to invention of a particular kind: directed to economising the use of a factor which has become relatively expensive”. As Rosenberg (1963) notes, similar opinions are reported by many other scholars, like Kaldor (1960) and Rothschild (1956). Vivarelli (2014, p.123) says that “Most new technologies are introduced to save labor”. As reported in the introduction, according to Baldwin (2018) this is nowadays particularly true in the case of manual jobs and manufactory phases of the production.

Among classical studies, it is evident this point of view in Marx’s texts (1992). In the Marxian framework, the capitalist must constantly expand the extraction of surplus-value if he wants to survive the economic competition. This can be pursued in two ways: expanding absolute and/or relative-surplus value. The former corresponds to an increase in labour-time. Following Marx’s definition, (1992, p.221): “The surplus-value produced by prolongation of the working day, I call [it] absolute surplus-value.” If the number of hours of work increases, the worker will produce more hours for free for the capitalist after that he has re-paid his proper wage. Nevertheless, the impossibility of infinitely expanding the absolute-surplus-value extraction seems an insurmountable obstacle. In other words, capitalists cannot increase the working time

over a certain limit, because humans cannot work continuously without eating, sleeping, and resting. This impossibility leads to the relative-surplus value extraction, which can be both reduction of wages and/or innovation. Marx (1992, p.221) defines it: “The surplus-value arising from the curtailment of the necessary labour-time, and from the corresponding alteration in the respective lengths of the two components of the working day, I call [it] relative surplus-value.” As said, the reduction of the necessary labour-time to re-pay the wage of the workers can happen through the reduction of the wage or the increase of production thanks to technological and process innovation. Wages cannot be reduced under a certain minimum, because of workers’ protests and because of the cost of living. Consequently, capitalists would invest in innovation to increase workers’ productivity while keeping the same labour time. Then, passive drivers, like a high cost of labour, are a sort of double edge sword. They pose a problem to the entrepreneur, but, exactly for that reason, they can encourage process innovation.

It is my conviction that the Marxian model could be applied to offshoring. Interestingly, offshoring is mainly led by the goal of cutting costs like process innovation. For example, Moxon (1975) has sustained that offshoring (like process innovation) would be mainly led by passive drivers, more than strategic and innovative choices. Similarly, Kotabe (1990, p.625) wrote that: “Offshore production occurred most often in response to competitive pressure, both foreign and domestic, and less frequently as an aggressive move in response to opportunities for opening new markets for a new product”. Vernon (1974) finds similar results. If these studies could be outdated, the most recent ones confirm the results. In Europe, the main reason to relocate the production is to decrease the cost of labour, according to Dachs et al. (2012).

These works made me think that offshoring could be used as a peculiar form of relative surplus-value extraction. As I said, the main practises to extract relative surplus-value are the reduction of wages and the process innovation, but the impossibility to reduce the wages under a certain level would lead to the second option. Nevertheless, in the contemporary globalised economy, it is possible to reduce the costs of labour even reaching some levels that in the home country would be under the level of subsistence. The way to do so is to offshore the production to developing countries, where products and labour are cheaper. For example, in Western countries, it would be impossible to pay a manual worker 338\$ per month. When a company has already reduced the cost of labour, if product innovation is not possible, the only alternative to increase the profits is process innovation, to increase the productivity of the workers. On the other hand, 338\$ per month is the average wage of a manual worker in Georgia (Fariselli, 2020, p.412). An entrepreneur, then, could consider the option to relocate the production to avoid the risks of process innovation. Indeed, innovating is a complex and dangerous procedure for an entrepreneur and many scholars have underlined how, exactly due to its innovative nature, it is difficult to make rational cost-benefit analyses about it (Arrighi, 1994; Fariselli, 2013; Schumpeter, 1983).

Then, I assume that offshoring is used as an alternative to process innovation, so to reduce the cost of labour without taking the risks of innovating. If this is true, offshoring would certainly reduce the process innovation in the home country.

In addition, it is relevant to note how offshoring, which I consider as a practice to extract relative surplus-value, would also englobe some absolute-value extraction’s features, because usually

the developing countries have weaker workers' rights, so it could be possible to impose longer working time to local workers too.

To sum up, I want to investigate if offshoring can be used as an alternative to process offshoring. I developed this hypothesis starting from some classical works, especially Marx (1992). If this hypothesis is true, offshoring would have a negative impact on process innovation. The advantage of offshoring on process innovation is that relocations permit to make an easier cost-benefit analysis and avoid the problems of innovation. Offshoring the production to a developing country gives the chance of both paying lower salaries to workers (relative-surplus value) and, potentially, expanding the working time (absolute surplus value). If this is correct, during the investigation of the two case studies I should find that companies decide to use production offshoring instead of investing in process innovation. I will call it the *Labour-saving hypothesis* and its short version can be written in the following way:

Labour-saving hypothesis: offshoring has a negative impact on process innovation in the home country because the former is used as an alternative to the latter

2.2.3 Hypothesis 2: Trade-unions hypothesis

Workers do not only have an indirect impact on the process innovation due to their salaries, but an active one too. As it was already reported, among the other things, workers can give important feedbacks to implement and perfect the production line. Nevertheless, workers mainly affect innovation and production as a community, not as single individuals. Workers that cooperate all together can develop skills, knowledge, and dynamics, that make their group more than the simple sum of the parts. All these aspects can be extremely important in the production process.

Studying the role of workers as a community, the impact of trade-unions seems particularly interesting. Their effect on innovation is highly controversial, although not very discussed in academia. Some texts have sustained that trade-unions could hinder innovation (Kotabe, 1990; Connolly, Hirsch & Hirschey 1986; Buzzell & Gale 1987). Nevertheless, some of the motivations reported were quite weak (e.g., some studies suggest that due to high wages bargained by trade-unions, entrepreneurs have fewer capitals to invest in innovation and machines, so trade-unions could negatively affect innovation. Nevertheless, this problem could be easily solved by credit institutions) (Menezes-Filho & Van Reenen, 2003). In addition, the correlation that some of the studies find could not be a causality. For example, dealing with its results, Kotabe (1990, p.632) admits that "Due to the cross-sectional nature of the sample in this study, a strongly negative correlation between unionization and R&D intensity may be reflective of the fact that newer industries (e.g., semiconductors) tend to be more R&D-intensive and less unionized than older ones". On the other hand, Daniel (1987) reported with a survey how, in the UK, trade-unions are generally in favour of technological innovation. Addison & Wagner (1994) find a positive impact of trade-unions on innovation in the UK too. Menezes-Filho & Van Reenen (2003) note that a similar trend is evident in Europe, but not confirmed in the US.

I assume that trade-unions could have a positive impact on process innovation. Considering that relocations weaken trade-unions, as many studies have demonstrated (Bain & Taylor, 2008; Ebenstein et al., 2014; Harrison & McMillan; 2006; Oldenski, 2014; Žuk, & Žuk, 2018), I expect offshoring to negatively impact the process innovation in the home country. It is relevant to note that, when dealing with trade-unions, not only the two case studies are relevant, but the impact on other firms must be considered too. Indeed, trade-unions are collective actors, so if they are weakened by offshoring, they are damaged in other firms too, not just in the company that offshored.

Here, I would like to indicate two factors that are at the bases of what I have called the *Trade-unions hypothesis*. Both explain why trade-unions would encourage process innovation. The first factor is more focused on how trade-unions can indirectly influence process innovation (e.g., increasing salaries) and it is partially like what I said in the previous hypothesis. To support it, I will mainly use the work of Hicks (1963). The other one is more direct, and it is focused on what trade-unions can practically do to stimulate process innovation (mainly, reinforcing knowledge, feedbacks, and experience of workers). To support it, I will mainly use Griliches (1969) and Freeman & Soete (1984). According to these two factors, I assume that trade-unions can have a positive impact on process innovation, and that offshoring, weakening trade-unions, can also indirectly hinder innovation.

Wages and unemployment factor:

The first reason why trade-unions could stimulate innovation is that trade-unions can higher wages and ameliorate workers' conditions, as many studies have demonstrated (Blanchflower & Bryson, 2010; Green, Machin & Wilkinson, 1999). If wages are a relevant cost for an entrepreneur, it is important to note that trade-unions can push entrepreneurs to face other costs, like higher security or environmental standards. All these things are perceived by the entrepreneurs as increasing costs. As shown before, Hicks (1963) sustains that if a factor becomes relatively expensive, there are more incentives to invest in the other factor. Rosenberg (1963) confirms how, according to the model of Hicks, higher wages can push for capital investments and labour-saving innovations. If an increase in the cost of labour incentivises technological investments, it is logical to assume, on the opposite, that those factors that reduce the cost of labour can disincentivise capital investments. Following Hicks (1963), if the labour is relatively cheap, it is more convenient to invest in workers than in machines and innovation. As it has been sustained by many scholars (Ebenstein et al., 2014; Harrison & McMillan; 2006; Žuk, & Žuk, 2018), offshoring reduces wages and worsens workers' conditions, both creating unemployment and weakening trade-unions. Consequently, those things that negatively impact trade-unions can hurt innovation too, because weaker trade-unions usually lead to lower wages, and low wages push for labour-intensive investments instead of process innovation.

Collective voice factor:

In addition to this indirect effect of trade-unions on innovation, some others are more direct. I have already reported how workers can give extremely important feedbacks to improve and ameliorate the innovations and the production process. First, trade-unions can reinforce these feedbacks and information exchanges. A similar stance was supported by Freeman & Medoff (1984) when talked of a *collective voice*. According to them, trade-unions can institutionally

channel workers' discontent, and in this way lead to changes and improvements in the production process and working conditions.

Then, trade-unions can contribute to process innovation reinforcing both the training and experience of workers. Trade-unions have a relevant role, extremely understudied by academia, in supporting workers' education, formation and training. Studies have demonstrated that strong trade-unions workplaces tend to have also more skilled workers, because trade-unions usually include training and new-skills development in the bargains with the company (Green, Machin & Wilkinson, 1999). The importance of well-trained workers is also sustained by the skill-biased technological change (SBTC) theory of Griliches (1969), which suggests that some kinds of innovations can be realised only with highly skilled workers, and that, on the other hand, workers' lack of education can deeply constrain innovation. In addition to that, if workers are not well-trained, they will not have the skills to give the abovementioned feedbacks and suggestions on how to improve innovations. The other relevant aspect that allows workers to give useful feedbacks is the experience. Without a deep knowledge of how the production process works it is impossible to detect the main problems of that process and fix them. This can be called tacit knowledge (Howells, 1996) or workers know-how. In this sense, trade-unions can play a relevant role, because they usually push for more stable contracts and less flexible conditions, which are a pre-condition for a more expert working force. It is not a case that some studies (Ng & Feldman, 2010; Wang, Yeung & Zhang, 2011; Welbourne, Johnson, & Erez, 1998) have shown how stable contracts can support innovation. Therefore, if offshoring weakens trade-unions, workers' training and experience can be damaged, negatively affecting process innovation too.

To sum up, I want to investigate if offshoring can indirectly reduce process offshoring due to its negative impact on trade-unions. As said, it is important to note that when trade-unions are weakened, this can have some consequences on other companies too, not just on the offshored ones. I developed this supporting it by two different factors, mainly the role of trade-unions on wages and employment and the role of trade-unions on training, stability of contracts and workers' tacit knowledge. The main authors that I have used are Hicks (1963), for the former, Griliches (1969) and Freeman & Medoff (1984), for the latter. If the assumptions reported are correct, offshoring would have a negative impact on process innovation. Weakening the trade-unions, the offshoring would conduce to lower salaries, more unemployment, less trained and unexpert workers, and more unstable contracts. All these aspects damage innovation, so offshoring would negatively affect innovation too. If my hypothesis is correct, during the investigation I should find that the offshoring weakened trade-unions; that for the abovementioned reasons trade-unions had a positive impact on process innovation, and so the wages, employment, training, and contract stability of the workers has been negatively affected by the offshoring. I expect this both in the companies that I am analysing and in other firms. I will call it the *Trade-unions hypothesis* and its short version can be written in the following way:

Trade-unions hypothesis: offshoring has a negative impact on process innovation in the home country because it damages trade-unions, which are drivers of innovation thanks to their support for high wages, high employment, training for workers, and stable contracts.

3 Methodology

3.1 Level of analysis and qualitative method

The previous studies have influenced my methodological approach. First, it is relevant to note that my goal is to investigate the impact of offshoring on process innovation *in the home country*. Most of the studies that analyse this link focus on the company that delocalised, trying to investigate if it becomes more or less innovative. In this sense, this paper could be more useful for a policymaker than for an entrepreneur that wants to decide if to outsource the production or not. I opted for a national level analysis because it was big enough to trace the impact on other companies (impossible with a regional lens) but small enough to detect the impact of the offshoring (impossible with a continental lens)

Then, in contrast to previous studies, I have used use a qualitative method. My first idea was to use a mixed-method, with both a quantitative and qualitative study. Unfortunately, I checked the datasets of OECD, Banca d'Italia (Bank of Italy), ISTAT (the Italian National Institute of Statistics), IMF, and World Bank, but I did not find an appropriate dataset to investigate this topic at a national level. I have also tried to contact the European Manufacturing Survey (EMS), whose dataset had been used in some of the previous studies in this field, but they communicated to me that the project was concluded, and that Italian data had never been collected. On the other hand, going on with the literature review, I realized that the main weaknesses of the previous studies were more theoretical than practical (see Literature Review). Consequently, the practical problems to find a good dataset and the review of these articles convinced me that a deep literature review and a discussion of the most neglected theoretical aspects could be more enriching for the debate than another quantitative study that did not manage to overcome the problems of the previous ones.

3.2 Case studies

In my qualitative study, I have focused on two case studies, both taken from the Italian industry. To investigate them, I have used semi-structured interviews. Case studies can give access to unexpected but relevant information, and they permit the detection of factors like historical trends or informal practices, that can hardly be investigated with both quantitative analyses and other types of qualitative methods, like surveys.

Many are the reasons why I decided to investigate Italy. First being Italian, I already knew the culture, the language, and the social history of the country. Then, Italy gave me some practical advantages. It was easier for me to talk with interviewees and find useful contacts. An added

value could have been to realise the interviews in person. An in-person interview can give access to informal but relevant information that can rarely be obtained through an online meeting. This is especially true in the case of semi-structured interviews. Unfortunately, because of Covid-19, I had to change my idea and I conducted all the interviews online. The final reason for my choice is that Italy is a particularly interesting case. Italy is the OECD country with the weakest economic growth in the last 25 years (Max Planck Institute, 2021). In the 1980s it was the fifth economy in the world in absolute terms, richer than Great Britain and close to France, while today it is the eighth and it is steeply declining, with bad innovation rates and falling salaries (OECD, 2021; WIPO, 2021).

As said, I wanted to work on a national level. Consequently, I chose two case studies that could be representative of the Italian economy. Analysing two case studies instead of one also gave me the chance to investigate the differences and similarities between them. In one case, Embraco company has no other plants in Italy. In the other one, GKN, the company has another plant in Brunico, close to Austria.

Then, two case studies could be more representative of the Italian economy than only one. The cases that I chose are the GKN firm of Campi Bisenzio (Tuscany) and Embraco of Riva (Piedmont). Historically, Tuscany and Piedmont are two of the most industrialised and richest regions in Italy, but in the last decades both the regions (and Italy in general) have faced a deep process of de-industrialisation. Then, both the companies are part of two sectors, household appliances and automotive, that have been historically crucial for the development of Italy. Berend (2006) has indicated household appliances and automotive as the two crucial sectors that led the Italian economic boom. Finally, both the companies were part of the FIAT (today FCA) group, the biggest player in the Italian industry in the last century. All these reasons make the two companies highly representative of the Italian industry. The final aspect why I chose these two case studies is that their products, compressors and driveshafts, can hardly be innovated. Consequently, the main innovations possible are process ones. In this way, I could limit the impact of product innovation, an aspect that, as I said before, would have complicated my research making it unmanageable.

3.3 Historical context

It is impossible to talk about the Italian industry without dealing with FIAT and its historical owners, Agnelli's family. FIAT has been the biggest car producer in the country for more than a century. Although cars were the main product of FIAT, the group was a player in many other sectors of the Italian economy too, like household appliances. Migone (1974) sustains that between 1958 and 1964, 20% of the investments in the Italian economy were implemented by FIAT managers. Historically, the economic relevance of FIAT and the power of Agnelli's family has always been so relevant that even Mussolini, the Italian dictator, complained about

that². In 1989, FIAT counted almost 270 000 employees (Revelli, 1989). In the 1970s, only in the Mirafiori plant (Turin), the main production site of the company, FIAT had more than 60 000 workers (Ietri, 2010).

FIAT is connected to the two case studies that I have analysed analyse. They are the Embraco firm of Riva (Piedmont) and the GKN firm of Campi Bisenzio (Tuscany).

3.3.1 First case study: Embraco

The Riva plant had been built during the 1970s and produced refrigeration compressors for Aspera (FIAT group). In 1985, Aspera was sold to Whirlpool, the American multinational corporation and global leader in household appliances. In the 1990s, under the direction of Whirlpool, the plant reached its maximum development, with 2500 workers and the production of 4,5 million compressors per year (Sbordoni, 2022). In 2000, Whirlpool officially sold the Riva plant to Embraco, a Brazilian company part of the Whirlpool group and specialised in compressors.

With Embraco, the first problems began. Thanks to the new policies of the EU, Embraco started offshoring the production to Slovakia to reduce labour-costs. In 2004, the workers of Riva were half of ten years before (Sbordoni, 2022). At that point, Embraco declared for the first time its intention to close the site. Trade-unions, Piedmont Region, and the government intervened to avoid it, but with poor results. Embraco continued to reduce the employees, but it agreed to keep the plant open until 2011. In exchange, it received public funds from the Italian government. This pattern was reproduced many other times until 2017. The plant was always saved with public money, and in exchange, the company accepted to keep the plant temporarily open. The government never asked for re-industrialization programs or similar commitments, and always gave the chance to Embraco to continue the downsizing.

In October 2017, the Riva plant had 537 workers, and the company declared that due to the end of social-safety net funds the company was going to deeply cut the number of workers. Trade-unions organised a strike highly supported by the population. In 2018, Embraco officially declared the closure of Riva site. Trade-unions and workers organised new strikes and demonstrations, receiving the formal (but not practical) support of the European Parliament. Nevertheless, the public image of the Whirlpool group was having relevant negative effects due to this closing procedure. Consequently, Embraco decided to interrupt the general firing and to

² Famously, he once said that “FIAT must stop acting as a State into the State” (Villari, 1995, n.p.)

look for companies that could re-industrialise the plant. In the end, Embraco indicated Ventures, an obscure new company, as its new partner. Ventures wanted to develop drones to clean photovoltaic panels and its project received the support of the Italian government. At this point, the re-industrialisation started, and workers were put on layoff. Soon, the trade-unions realised that the re-industrialisation program was non-existent. After 13 months, the new machines to produce drones have not arrived yet. Trade-unions restarted the strikes. Embraco stopped paying the salaries to workers and, in 2020, the court of Turin declared Ventures as failed. The Italian government tried to create a new company of compressors, mixing the Riva plant with another one in a similar situation, but the beginning of a new administration led by Mario Draghi interrupted the project. Finally, in 2021, the Riva plant closed, and the last 377 workers officially lost their jobs.

3.3.2 Second case study: GKN

The firm of GKN in Campi Bisenzio (Tuscany) had a similar story. Built by FIAT, it produced driveshafts for all the Italian automotive sector. In 1994, the plant was bought by GKN, a British multinational corporation that develops automotive sector components (Ghidini, 2021). The main consumer of Campi Bisenzio products continued to be the FCA Group (former FIAT), which bought 80% of the driveshafts produced in Tuscany. In 2018, Melrose Industries, a financial fund specialised in economic restructuring and financial speculations whose motto is “Buy, improve, sell”, took control of all the GKN group through a hostile takeover. After the hostile takeover, approved by the British government, Melrose started a general restructuring of GKN. The company was divided into three smaller groups: GKN Automotive, GKN Aerospace and GKN Powder Metallurgy. Some of the plants were closed and their production was offshored to Poland. Among them, there was not just the plant of Birmingham, the first one in the history of GKN (Ferrara, 2021), but also that of Campi Bisenzio.

This case became relevant in the Italian debate not only because Tuscany is a very relevant region for the national economy, but also for the unacceptable way in which the closure was implemented. The 422 workers were unexpectedly fired with a message on WhatsApp (9th July of 2021). Considering services too, more than 500 people have lost their jobs. Trade-unions and workers organised the first strikes and sued the company. After a few months, the court of Florence recognised that GKN had an anti-union behaviour, because the procedure (no previous communication) and the way (no previous discussion with trade-unions to find alternative solutions) are not allowed by Italian laws. Due to these formal problems, the workers have been re-integrated. Nevertheless, this has only obliged Melrose to re-start the firing process following a different procedure, but it did stop the plan of offshoring that, indeed, went on. In the same months, GKN workers of Campi Bisenzio organised a demonstration in Florence with more than 40 000 people and received the support of the public opinion. In particular, the Sant’Anna university has been active in assisting the workers. Two groups of support, Ingegneri Solidali (Solidary Engineers) and Economisti Solidali (Solidary Economists), were formed. GKN workers, together with these two groups of experts, wrote a re-industrialisation program focused on innovation. Unfortunately, like in the case of Embraco, the project did not find the support of Draghi’s administration, which ignored the plan.

The present situation of GKN is ambiguous. In December 2021, Francesco Borgomeo (advisor of GKN) bought the plant, saying that he wanted to re-industrialise it. Many newspapers and journals have described this as the end of the problem (Marsala, 2021). Nevertheless, this seems far from the truth. Up to now, Borgomeo's plans seem erratic. It is not clear what will Campi Bisenzio firm produce. Borgomeo has never officially presented his re-industrialisation, and many workers and experts doubt its real existence.

3.4 Interviewees and method

In my research, I have interviewed trade-unionists of Riva and Campi Bisenzio. They were members of CGIL-FIOM, the biggest trade-union in Italy. To have a wider point of view on the GKN case, I have consulted the two groups of experts, Economisti Solidali and Ingegneri Solidali. The Ingegneri Solidali have asked me to cover their names, because they preferred to be presented as a group. I have also tried to contact the managers of both Embraco and GKN, but with poor results. I have succeeded in interviewing one of the managers of Embraco in Riva, Zappone. On the other hand, the project director of GKN Automotive Europe, Ghezzi, has refused my interview and has reported to me how none of the employees of GKN is allowed to release interviews about this topic. Finally, I have talked with representatives of other plants to investigate how the offshoring affected trade-unions in the supply-chain. This part of the research has involved a CGIL-FIOM representative of the Whirlpool plant in Melano, a firm connected with Embraco, and two workers representants of FCA in Cassino and Melfi, in the Campi Bisenzio supply chain. Finally, I have talked with a CGIL-FIOM representative of the GKN firm in Brunico, the last plant of the company in Italy.

All the interviews have been recorded except one because of technical problems. The technique was that of semi-structured interviews. This type of interview gave me the chance to investigate the topics that I was interested in, but also left the interviewee to be partially free to talk. In this way, I discovered interesting and useful information that I did not know and that would not have been detected with a more rigid form of interviewing or a quantitative method. For reasons of space, I will only report the most relevant contents and not the whole conversations. The interviews have been conducted in Italian. All the translations from Italian to English in the present thesis, including the quotations from the interviews, have been done by me. I have spontaneously decided to cover the names of the workers of the Melfi and Cassino plants of FCA. They did not ask me to do it but, during our conversation, they reported to me how in the past they have been vexed by their company because of their trade-unions activities. Consequently, I have decided to cover their name to avoid any risk.

In total, I have conducted nine interviews, that can be schematised in this way:

- Ugo Bolognesi, CGIL-FIOM trade-unionist, Embraco plant of Riva.
- Dario Salvetti, CGIL-FIOM trade-unionist, GKN plant of Campi Bisenzio.
- Emerson Lange Zappone, manager of Embraco, handled the offshoring process of the Riva plant.

- Pier Paolo Pullini, CGIL-FIOM trade-unionist, Whirpool plant of Melano (part of the supply chain of Embraco).
- Christian Maurlechner, CGIL-FIOM trade-unionist, GKN plant of Brunico (the other plant of GKN in Italy).
- An anonymous trade-unions member of the FCA plant of Cassino (part of the supply chain of GKN).
- An anonymous trade-unions member of the FCA plant of Melfi (part of the supply chain of GKN).
- Bruno Settis, university researcher and member of the group of experts called Economisti solidali (Solidary Economists), that helped the workers of GKN to write an industrial plan for their firm from an economic perspective.
- Four university researchers and engineers, members of the group of experts called Ingegneri solidali (Solidary Engineers), helped the workers of GKN to write an industrial plan for their firm from a technical perspective.

With my interviews, I have tried to investigate if the two case studies, representative of the Italian industry, support the two hypotheses that I did. In the next section, I will report the results.

4 Results

In the present part, I have explored the two hypotheses enounced in the Theoretical Framework through the interviews about the two case studies. The two hypotheses are investigated in two separate sections. In each section, I will analyse both Embraco and GKN. After that, I will comment on these results, showing how and if they are connected to the theory.

4.1 *Hypothesis 1: Labour-saving hypothesis*

The main interviews that have permitted me to investigate this hypothesis are those with Bolognesi, trade-unionist in the Embraco of Riva, Salvetti, trade-unionist in the GKN of Campi Bisenzio, and Zappone, manager of Embraco.

Clearly, offshoring is a complex phenomenon that can hardly be explained only by one factor (like the cost of labour). Despite this, all the interviews have confirmed that in both GKN and Embraco offshoring, the labour-cost was one of the main causes. Bolognesi (interview, 21 April 2022) told me that the company wanted to cut the costs of production because Slovakia's costs were more competitive. Obviously, the cost of labour is only a part of the advantages of offshoring. A new plant in a different country could afford to cut transportation costs, find looser environmental laws, expand the working time, save money on security and quality standards and many other advantages, as Bolognesi underlined (interview, 21 April 2022). Zappone (interview, 11 May 2022) confirmed that labour-costs were one of the main aspects that led them to offshore, because they weighted around 30% of the final price of the product. It is interesting to note that both the plants were highly productive. Particularly impressive is the case of the Riva plant, which, according to Zappone (interview, 11 May 2022), was the most productive site in the whole Embraco group. Nevertheless, its costs were too high to make it profitable.

If it is evident that high labour-costs can be a factor that pushes a delocalisation, it is more complex to establish if the offshoring is used as an alternative to process innovation. Here, an interesting phenomenon can be noted. Both the companies bought a vast number of new machineries for the two plants in the years before the offshoring. Embraco did it to produce the VES compressor. Something similar happened in GKN. There were two relevant periods of investments implemented by GKN in Campi Bisenzio: one in 2017, during the period of Industry 4.0, and one in 2019, when an entire production line was moved from Brunico (the second GKN plant in Italy) to Campi Bisenzio. According to Salvetti (interview, 6 May 2022), in those years GKN invested around 24 million euros in six years to buy new machines. In both cases, the managers presented the event as a new start for the plant. In the case of Riva, workers even accepted to reduce some of their contractual rights and protections to make the plant more

attractive and receive VES investments, as confirmed by Bolognesi and CGIL-FIOM official documents (CGIL-FIOM, 2017).

At first sight, these investments would deny the *Labour-saving hypothesis*. If Embraco and GKN invested in new machinery and process innovation before and during the offshoring, it is not possible that the offshoring was used as an alternative to the process innovation. On the opposite, it could give support to what I called *specialisation mechanism* (see Literature Review), which sustains that, through the offshoring of manual jobs, Western countries would specialise in innovative and more technological productions.

Nevertheless, a deeper investigation of the two case studies shows that this is not correct. The investments in new machinery were made thanks to the public funds created by the Italian Government to support the Industry 4.0. Both Embraco and GKN seem to have received public money from the government to buy new machinery. Unfortunately, there is not a public register that lists all the companies that have received public money. Nevertheless, Salvetti (interview, 6 May 2022) is sure that GKN has received these incentives. This is confirmed not just by the Economisti Solidali (interview, 4 May 2022) and some newspapers (Cini & Tassinari, 2021), but also by the former deputy Minister of the Economic Development, Todde (Cutro, 2021). Bolognesi (interview, 21 April 2022) has sustained the same thing about Embraco. In neither of the two cases the investments in machines have led to a specialisation of the production or more innovative practices. On the opposite, it seems that the new machinery, bought with the Italian public money, has been or will be offshored to the new plants after the closure of the firms. In the case of GKN, the equipment has not abandoned the plant yet. Nevertheless, Salvetti (interview, 6 May 2022) said that “In the agreement that Borgomeo [the new owner of the plant] has signed with the Italian government, workers, and GKN there is a legal binding. He cannot use the machines in the plant to produce driveshafts, and he cannot sell them to other companies. It is extremely probable that, in the end, he will give them back to Melrose”. Probably, Borgomeo (a former advisor of GKN) will re-sell this machinery to GKN, because he cannot do anything else with them. Without an interview with a GKN manager, it is impossible to establish if the accumulation of machinery (paid by the Italian government and that could be offshored in other plants) was a rational strategy or not. What we can say is that, according to Salvetti (interview, 6 May 2022), this accumulation was evidently not led by productive goals:

Starting from 2017 [when the Industry 4.0 plan was implemented in GKN], they went crazy. They put new machines and robots everywhere. Ironically, we [the workers of the plant] said that there were robots even to open the bottles of Coca-Cola. We tried to convince them that the market of driveshafts was too small for full-automatization, and there was a reason if during the years the automotive sector had moved back from full-automatization to semi-automatization, but there was no way to stop them from buying new machines”.

The Ingegneri Solidali (interview, 21 April 2022) doubt that there was a real plan for re-industrialisation and innovation, but only the desire to accumulate machines that could be offshored in a successive moment too: “At the basis of the Industry 4.0 there are the collection and analysis of data. In Campi Bisenzio, they bought many machines, but then, when there were some problems, you had to signal them through a paper document. If you do so, it means that your innovation is only cosmetic”. Another factor that suggests that GKN was simply

accumulating machinery paid by the Italian state to offshore in a successive moment is that, according to Salvetti, Campi Bisenzio received the last machinery only three days before the offshoring. Salvetti (interview, 6 May 2022) only sees two explanations for a similar behaviour: “There are only two chances. The first one is that GKN did not take public funds for this machinery, they were acting in a totally irrational way, and the machinery will be thrown away. The second is that they received public grants, and this machinery will come back to GKN”.

If in GKN the offshoring of the machines has not happened yet, although it seems very probable, it has already happened in the Embraco case. Zappone confirmed it to me. The manager of Embraco told me that:

The company has received public funds from the Italian institutions... Most of them were used to buy pieces of machinery that we used to produce the VES compressors... After the closure of Riva, they were offshored to new plants. Not all in a single plant, but in many different ones, according to our necessities. We still have some machinery in the storage, but almost 90% of them have already been moved to many different plants, like in Slovakia, Brazil, Mexico, and China (Zappone, interview, 11 May 2022).

Finally, both the cases give relevant support to the hypothesis of offshoring used as an alternative to process innovation. Again, dealing with GKN I cannot have a double-check because I could not interview the managers of the company. Nonetheless, the opinion of Salvetti (interview, 6 May 2022) is very clear:

[The fact that cutting-cost offshoring was used as a substitute to process innovation] is implicitly part of the nature of Melrose. Melrose is a hedge fund that makes financial speculation. On average, they take a company and sell it after 3-5 years. In such a short period, it is impossible to implement a re-industrialisation plan or a process innovation and to create profit for the shareholders. The only way to create profit in such a short period is through the cut of costs.

This is also confirmed by Maurlechner (interview, 22 April 2022), workers-representant of GKN in Brunico. He thinks that, since the arrival of Melrose, there is less interest in innovation, although the investments in new machines supported by the Italian governmental funds are continuing.

In the case of Embraco, Zappone (interview, 11 May 2022) has explicitly admitted that the cut of the costs was used as an alternative to implementing a process innovation in Riva:

There were two re-industrialisations, one implemented and one interrupted. In the first case, we tried to produce the VES compressors, but it did not work. At that point, we could choose between implementing a new, deeper re-industrialisation and innovation of the process, or simply cutting the costs through offshoring the production. We opted for the second... [After the unsuccess of VES compressors, caused by too high costs] we could try to make a re-industrialisation. But imagine being a shareholder: when you make a similar process, you must dismantle the plant and re-organise it. If you must dismantle the plant in any case, it is more

profitable to offshore the production after the dismantling. We realised that offshoring was more profitable than re-industrialising or innovating the process in the plant.

4.2 *Hypothesis 2: Trade-unions hypothesis*

All the interviews have permitted me to check this hypothesis. I will divide this section, investigating the two factors according to which the hypothesis is based in separate parts.

Wages and unemployment factor:

In both cases, the offshoring created unemployment. In total, around 400 people lost their job in Piedmont due to Embraco and almost 500 in Tuscany due to GKN offshoring. Indeed, to the workers that were fired, we must add the workers of the supply chain (e.g., service ones) that can be negatively affected by the offshoring. Even in the few cases in which workers find another job, their working conditions are usually worsened. Bolognesi (interview, 21 April 2022) noted: “Almost all the workers of Embraco have worsened their condition after the offshoring. The luckiest ones have found a similar job. The majority are unemployed, or they have precarious contracts, doing jobs in which their skills are not used, and their salaries are lower than before. They are demoted”.

According to the interviews, it also seems that offshoring weakens the contractual power of trade-unions and reduces salaries, removing some incentives to process innovation. “The case of Embraco, together with other cases of offshoring, has undoubtedly weakened the contractual power of workers and trade-unions. Dozens of times a company told me (explicitly or implicitly) that the workers had to accept the conditions of the company, or the company could close the plant”, Bolognesi said (interview, 21 April 2022). Of course, it is difficult to establish how much the specific case of Riva impacted. In this sense, Bolognesi (interview, 21 April 2022) noted how there is a general trend of offshoring and de-industrialisation that characterises the Italian industry. The 2008 Crisis certainly played a role in this process. Between 2008 and 2014, the unemployment rate in Italy jumped from 6,7% to 12,7% (Statista, 2020). Bolognesi thinks that the weakening of trade-unions was particularly sharp because of Marchionne’s leadership (CEO of FIAT-FCA from 2004 to 2018) and Renzi’s administration (Italian President of the Council from 2014 to 2016). In 2011, Marchionne organised a referendum among workers of Mirafiori (the biggest and most historical plant of Fiat) which asked for new contracts and fewer rights for the workers in exchange for investments in the plant. Before the referendum, he explicitly said that in case of denial of his plan, the Mirafiori firm would have been suppressed. In the end, the plan received approval with the 54% of the votes (Griseri, 2011). Despite the promises, the new investments never arrived (Bauducco, 2018). In the same years, on the political side, the Renzi administration was generally perceived as standing on the side of companies against the trade-unions (Martini, 2016). Renzi, leader of the main Italian

centre-left party (the Partito Democratico) from 2013 to 2017, had always expressed his support for Marchionne strategies (Galbiati, 2015) and indicated Blair and Clinton as his political models. In 2015, while he was President of the Council, he implemented the very discussed Jobs Act, which weakened trade-unions and facilitated the procedure to fire workers, incentivising the use of precarious contracts (Fana, Guarascio & Cirillo, 2016). As it is easy to understand, the role of trade-unions was weakened not just by the offshoring, but also by the more general context that I have just described. Many works have underlined how the Mirafiori affair was a real turning point in the Italian labour relations (Balcet & Ietto-Gilles, 2019; De Luca Tamajo, 2015), giving the message to the economic system that companies could implement more aggressive practices against workers without serious repercussions.

Although the general context has certainly led to weaker trade-unions, decreasing salaries, and growing unemployment, some of the interviewees have noted a direct and negative impact of the two relocations on both working conditions and employment rates in other plants. This is for example the case of the two anonymous workers of FCA plants in Melfi and Cassino. Both these plants were part of the Campi Bisenzio supply chain. “When a relocation happens, the immediate reaction in the supply-chain are worse job conditions for workers... Since the closing of GKN, the production of Cassino has decreased, both from a quantitative and qualitative perspective”, told me the worker of Cassino (interview, 20 April 2022). Similarly, the worker of Melfi (interview, 28 April 2022) said:

When part of the supply chain is offshored, a clear signal arrives at trade-unions. It means that there is not a real industrial plan in that sector. As a reaction to the closing of GKN in Campi Bisenzio, the FCA of Melfi immediately implemented some redundancies. Another reaction is that, in the other plants, trade-unions have become weaker. The company holds all the cards, and trade-unions must accept the fact that workers’ conditions will deteriorate

As seen, the Campi Bisenzio offshoring sharply weakened the trade-unions’ contractual power and worsened the working conditions in other plants too. For example, after the offshoring of GKN, the interviewee of Cassino (interview, 20 April 2022) tried to organise his co-workers and plan some solidarity demonstrations. He wanted to raise awareness among his colleagues about the GKN case and the risks that it entailed for the Cassino site too. The reaction of FCA was heavy:

Officially, the company did not do anything. In practice, it is impeding me and some of my colleagues to work. Considering that we are on a temporary layoff, the company can decide who is working and who is not. If you work for less than 50% of the monthly working days, you do not get access to benefits such as retirement money, paid holidays, and financial coverage for sick days. Since we started talking about GKN case in our plant [Cassino], the company is preventing us to reach the 50% of the working days, and in this way, we are highly damaged from an economical point of view” (worker of Cassino, interview, 20 April 2022).

According to Maurlechner (interview, 22 April 2022), the offshoring has negatively impacted on trade-unions’ power in Brunico too: “When something like the offshoring of Campi Bisenzio happens, everybody is scared in the other companies. A case like that makes you reflect.

Spontaneously, you think that if it happened to them, it could happen to you too". This would have scared his colleagues and made them more available to accept worse working conditions too.

Collective voice factor:

In the previous pages I have reported how, according to some academic papers, workers can play an important role to implement and ameliorate process innovation. This assumption (see Theoretical Framework) is supported by the interviews that I did. For example, the Ingegneri Solidali (interview, 21 April 2022) have a very clear opinion about it:

The feedbacks that the workers send to the engineers are crucial. In many cases, they give suggestions on how to ameliorate the production and remove some of the problems. This happened in the GKN case... During the design phase of some innovations, engineers can't foresee all the imperfections and problems. These can be fixed only through the feedback of the workers.

This feedback process from the workers to the engineers is so relevant that, according to the interviewee of Cassino, FCA has institutionalised it. Workers send feedbacks that can ameliorate or innovate the production lines. At that point, the engineers intervene and try to evaluate the suggestions and their feasibility.

The Ingegneri Solidali (interview, 21 April 2022) also reported to me the importance of experience in this feedback process:

It happens quite often that industrial machines have some problems that must be fixed. The metalworker must understand when it is better to work and when to stop the production line to fix the machinery. In every production process the feedbacks of workers are relevant. Nevertheless, these feedbacks can be given only thanks to the experience of workers, who after many years develop some specific competencies that are quite rare

This workers' know-how is something that can be built only through long years of training and experience. Salvetti (interview, 6 May 2022) is sure of the importance of workers' know-how to implement production, and, in this sense, he is convinced that the offshoring will make disappear this knowledge

It is impossible that after technical school³ workers are ready to work at high standards of quality. These machines are complex, and to handle them and the production process in a proper way you need experience. A technical school can give you the bases to do so, but you need to acquire the experience and the oral knowledge that is transmitted by other workers too. When there is an offshore, this know-how disappears forever

Indeed, both the production of driveshafts in Tuscany and compressors in Piedmont has disappeared, and with that the knowledge of the workers too. Bolognesi (interview, 21 April 2022) reported: “The know-how of workers on compressors has basically disappeared. Before, this was a strategic sector for Italian industry. Today, they are no longer produced in Italy”. Not just trade-unions give importance to workers’ know-how, but companies too. Proof of that is that Embraco tried to offshore the know-how of workers to the new plants. “For many years before the offshoring, the workers of Riva were sent to Slovakia to explain to the local workers all the secrets of that job. In this way, the knowledge developed through many years by local workers has been offshored too”, Bolognesi (interview, 21 April 2022) told me.

As said, this know-how is a patrimony not just for the specific company, but for the whole geographic area, and trade-unions worked to develop it, pushing for more training and more stable contracts for the employees. Bolognesi (interview, 21 April 2022) told me that in the case of Embraco “Trade-unions always asked for formation, education and training of workers”. In some cases, the company has accepted to invest time in new training of workers, but the seminars were ineffective and conducted in an unsatisfactory way”. In the long run, it became more and more evident that the request of training from the trade-union could not compensate the lack of a real productive plan. “Training is useful, and trade-union asked it to the company. Nevertheless, this is subordinated to an industrial plan. If there is no project to produce something, it is not possible to do real training. But this does not exclude that we asked for training. In general, in my experience, trade-unions always ask for it during bargains with companies”, said Bolognesi (interview, 21 April 2022). The version of Bolognesi is confirmed by Zappone too. “Trade-unions always asked to us more investments in innovation and more training for the workers, and we usually accepted. Without well-trained workers it would have been impossible to make Riva the most productive plant of the Embraco group”, he told me (interview, 11 May 2022).

³ In Italy, there are technical school that prepare and specialise teenagers to make practical jobs. These schools are an alternative to high school

The case of GKN shows not just how trade-unions supported more training for the workers, but also how they directly tried to fix some of the problems of the production suggesting some process innovations. This was confirmed to me by both Economisti Solidali and Salvetti. The trade-unionist told me that:

Between the workers and the engineers there were continuous disputes. We sent many alerts about the bad functioning of the production lines. We arrived at the point where the trade-unionists used their hours of union permits to discuss how to improve the production lines and reduce the waste. We organised many strikes, asking for better quality and maintenance for the production lines...We [trade-unionists] complained many times about the lack of training. According to the collective national contract for metalworkers, it was our right to receive 8 hours per year of training. In the specific contract that we signed with GKN, we obtained 16 hours per year. This training was never implemented by the company. We also wanted to create a document that could map our skills as workers. An example can explain this request. The company brought many robots to the plant. Officially, they were completely automatic. In practice, they had many problems. For example, they tended to jam. When the company brought all the robots, they did not do any kind of training, because they considered that, being automatic, they would have worked autonomously. In the end, we all learnt how to fix them, and we spent most of our working time doing that. Indeed, the training was not only necessary to learn new skills, but also to codify and officialise those skills that we have learnt by ourselves. Finally, the trade-union managed to obtain the training for handling the robots, 16 hours for the basic level and 16 hours for the advanced level. We did the basic level, but we never did the advanced one because the company closed the plant (Salvetti, interview, 6 May 2022).

The offshoring of Embraco and GKN not only made disappear the workers' know-how in the area, but also weakened contract conditions in other plants too. All the interviewees have reported a general increase in flexibility of contracts and precariousness during and after the delocalisation. I have already reported how the GKN offshoring led to layoffs and redundancies in the FCA firms of Cassino and Melfi. Pullini (interview, 22 April 2022), trade-unionist of the Melano plant of Whirpool (Embraco supply-chain) reported to me that after the offshoring of Riva di Chieri the contracts on Whirpool in Melano became more precarious, including those of engineers and researchers. Old workers were convinced to retire, and they were substituted by young workers with lower salaries, more flexible contracts, and fewer rights. Nevertheless, as for unemployment and lower wages, it is difficult to establish how relevant was the general context and how important were the two specific offshoring. For example, Maurlechner (interview, 22 April 2022), said that "Starting from the Jobs Act, expert workers with long contracts were substituted by young workers with short and precarious contracts". His experience seems to confirm that this precariousness could negatively affect innovation and the production process. "[More flexible contracts] are a problem because our work needs experience. Now workers are substituted every year, but in this way, they do not have the time to develop the skills to do a good job. The quality of our product has been affected by this trend". In Brunico, part of the workers is on layoff, and they are not producing anymore. Officially, GKN is creating an excellence centre with the University of Bolzano. The long-term profitability of an excellence centre seems in contradiction with the nature of a speculative fund

like Melrose, which usually looks for short-run profits. For this reason, Maurlechner (interview, 22 April 2022) seems doubtful about this project, and he notes that the experts and researchers of the excellence centre have been hired with flexible and precarious contracts too.

4.3 Discussion

In this section, I have commented the results that I found, connecting them to the theory.

4.3.1 *Labour-saving hypothesis*

I elaborated this hypothesis starting from Marx (1992). Usually, what Marxist works call relative-surplus value extraction is process innovation. In this thesis, I have sustained that the offshoring of production could be considered as a sort of peculiar case of relative-surplus value extraction used alternatively to process innovation. This permitted me to elaborate on what I called the *Labour-saving hypothesis*, which assumes a negative effect of offshoring on process innovation in the home country.

This hypothesis has been strongly confirmed by the interviews.

Thanks to the interview with Zappone, manager of Embraco, I can affirm with certainty that, after the unsuccess of VES compressors, the company used the production offshoring as an alternative to process innovation. Indeed, the company had a trade-off, and the cutting cost strategy seemed the most profitable one. If for Marx (1992) the reduction of wages under a certain level seemed impossible, the interview of Zappone clearly shows that through a relocation this becomes realistic.

In addition, the words of Bolognesi show, how it was suggested (see Theoretical framework), that offshoring has also some features of the absolute-surplus value extraction (Marx, 1992). Indeed, offshoring the production to developing countries permits the expansion of the hours of work too.

In the GKN case, I cannot have the same level of certainty because I miss a confirmation from the managers. Nevertheless, the lack of a strategy in investments (new machinery, purchased with Italian public funds, that will probably be offshored to other plants, as in the Embraco case) and the nature of the owner (Melrose, a hedge fund that keeps companies on average between 3 and 5 years and sells them after downsizings) are two very strong clues that suggest that GKN case would support the *Labour-saving hypothesis* too. Indeed, offshoring to gain short-term profits instead of innovating to take long-term ones seems part of the usual strategy of Melrose, according to Salvetti.

Up to now, the two companies are not only not innovating, but not even producing. It is relevant to note that it was possible to confirm this hypothesis only thanks to the use of the qualitative method. Indeed, with another method, the investments implemented by GKN and Embraco before and during the offshoring would have probably misled me.

4.3.2 *Trade-unions hypothesis*

The works of Hicks (1963), Griliches (1969), and Freeman & Soete (1984) suggested to me that trade-unions can play a positive role to support process innovation. Trade-unions can lead to higher wages and less unemployment (see *Wages and unemployment factor*). In addition, they promote training for workers and more stable contracts. These are crucial for workers to develop the skills and the knowledge necessary to give feedbacks to improve the production (see *Collective voice factor*). As I reported in the Literature Review, all these things can stimulate innovation not just in the specific firm, but in the others too. On the opposite, relocations weaken trade-unions and, consequently, all the abovementioned aspects too. Consequently, I hypothesized a negative impact of offshoring on the process innovation in the home country and I called this the *Trade-unions hypothesis*.

This hypothesis too, like the previous before, seems supported by my results, although with a minor level of certainty.

First, all the interviews noted how workers' feedbacks can be crucial to ameliorate process innovation. In addition, both the case studies support what Freeman & Soete (1984) called the *collective voice*. In Embraco and GKN, trade-unions directly tried to ameliorate the industrial process and improve the (partial) process innovations, channelling the complaining and protests of workers as suggested by Freeman & Soete (1984).

Then, in both cases, trade-unions supported higher wages and better working conditions. On the opposite, the offshoring created unemployment and worse working conditions, not just in the two companies but in other plants too, like the FCA plants in Melfi and Cassino. Consequently, according to Hicks (1963), in the future there will be fewer incentives to invest in innovation because labour-factor will be cheaper.

The interviews also corroborate that trade-unions promoted more training and education for workers, as previous studies by Green, Machin & Wilkinson (1999) sustained. This happened in both the plants, although trade-unions have not always reached their goal. In addition, Zappone confirmed the importance of training and education in implementing innovation, as suggested by Griliches (1969). The skills developed through training, together with workers' experience, not only constituted the workers' know-how, which according to Salvetti and Bolognesi will soon disappear due to the offshoring. They were also a pre-requirement for the elaboration of feedbacks from the workers to the engineers on how to improve process innovation.

Thus, the experience of workers is the final aspect that has been damaged by the relocation. Salvetti, Bolognesi and the Ingegneri Solidali confirmed the importance of workers' feedbacks for the production line. They also reported how, to give feedbacks, a long-run experience is crucial, as suggested by Ng & Feldman (2010). Trade-unions fought for more stable contracts in both the plants. On the opposite, the offshoring negatively affected contracts stability, and thus workers' chance to develop this experience. This negative impact not only damaged the workers of the two firms, but those of the supply chain. Worse contract conditions have been reported in the other Italian GKN plant (Brunico). In addition, the offshoring has negatively

affected contract situation in other companies, like Whirpool of Melano (Embraco supply-chain) and FCA plant of Cassino and Melfi (GKN supply chain).

The results that I found still leave some ambiguities about the intensity of the two offshoring's impacts, especially about contract stability and unemployment. Indeed, it was impossible to isolate the impact of the two offshoring from the general trend of the economy. If it is uncertain how deeply the two relocations impacted the Italian economy, the two case studies clearly confirm that they negatively affected the employment and stability of contracts in the whole supply chain.

5 Conclusions

In the present thesis, I have tried to investigate a topic usually undervalued by the economics of innovation: the impact of offshoring on process innovation in the home country.

As I reported, few papers deal with this issue. In the Literature Review, I reported some of the weaknesses of these works. In addition, none of these works explored what I called the *Labour-saving hypothesis* and *Trade-unions hypothesis*. The development of these new hypotheses can be considered the theoretical contribution of this thesis to the debate about offshoring and innovation. After that, I used two case studies, Embraco and GKN, to explore if they supported or denied the two hypotheses. These two companies seem to be representative of the Italian industry. To explore them, I have used semi-structured interviews with nine different agents. The groups of these people included engineers, economists, trade-unionists (of GKN and Embraco and other plants) and a manager. Before reporting some final observations, it can be useful and healthy to list those that, in my opinion, are the main problems of this thesis.

5.1 Limitations of the study

Writing this thesis, I have tried (as any researcher does) to eliminate all the problems and weaknesses that I detected. Nevertheless, this work contains at least two important limitations that, although detected, could not be eliminated.

The first limitation that I see in this work is that I only used a qualitative analysis, thus my work contains some of the weaknesses of that method. As previously said, my first ambition was to use a mixed method. In this way, I could have the advantages of both qualitative and quantitative analyses and fill the reciprocal gaps. In the end, I turned to a qualitative one. I did not manage to use a quantitative because, as I said before, the datasets in this field are very few and not satisfying. Consequently, I preferred to avoid the quantitative analysis because the outcomes could have been misleading. Nevertheless, it would be relevant to test the hypothesis reported in this thesis with a quantitative study too. To accomplish this task, it is crucial to find (or create) appropriate datasets. This does not mean that the use of a qualitative method, so neglected among the studies that investigate this topic, was unsuccessful. On the opposite, it has been useful and appropriate to investigate the topic. Thanks to that, for example, it was possible to detect that the investments done by Embraco and GKN were mainly a way to take advantage of public grants and not really to innovate the process. Nevertheless, the qualitative method leaves some uncertainties that are particularly evident in the *Trade-unions hypothesis*. If the negative impact of offshoring on wages and stability of contracts (in the two cases studied and in other plants) is widely supported by almost all the sources, it is not possible to isolate the specific impact of the two offshoring from the general trend of the Italian economy. To say

that in other words, we can affirm with strong support that the offshoring negatively affected contracts stability and employment, but we cannot establish the intensity of this effect.

The second main limitation of this thesis is connected to the incomplete access to the sources. As said, I interviewed many workers' representatives, experts, and engineers. Nevertheless, there is a lack on the side of managers of the companies. I talked with Zappone, a manager of Embraco that followed the Riva case. This interview was extremely useful because it permitted me to prove with certainty some of the assumptions that I did. Nonetheless, I would have desired to interview a manager of GKN, the new owner of Campi Bisenzio, Borgomeo, and some engineers of the research centre of GKN in Brunico too. Unfortunately, all of them refused to talk with me or did not answer my emails. Even in the case of an interview, it is imaginable that privacy policies would have restricted their freedom to divulge company strategies. The point of view and the opinion of these agents would have permitted me to present a wider and more general work. As said, it is only thanks to Zappone that I can confirm with certainty the *Labour-saving hypothesis*. The lack of double-checks with GKN managers left a certain level of uncertainty on some of the assumptions that I did. This limitation was not fixable because, as previously reported, it is part of the GKN policy of communication to not release declarations about this issue.

5.2 Final observations

This thesis sustains that offshoring has a negative impact on process innovation in the home country.

I hypothesised that offshoring can be used as an alternative to process innovation, consequently hurting the latter. I called this *Labour-saving hypothesis*.

I also hypothesised that relocations weaken trade-unions, consequently reducing employment, wages, workers' training, and contract stability. Considering these innovation drivers, I suggested offshoring could hurt process innovation. I called this *Trade-unions hypothesis*.

I can say that both the *Labour-saving hypothesis* and the *Trade-unions hypothesis* have been confirmed by the two case studies, although the first one has a higher level of certainty.

Offshoring can be used as an alternative to process innovation. This is what certainly happened in Embraco case and almost certainly in GKN one too. In this way, offshoring had a negative impact on process innovation in the home country (Italy). Indeed, the possibility to relocate the production eliminates the necessity to implement an innovation of the process in the home country.

Then, offshoring weakens trade-unions, and in this way process innovation too. The two case studies confirm that trade-unions supported many factors that can stimulate process innovation, like higher wages, higher employment, institutional channels to express complaints, a more skilled workforce, and more expert workers. The relocations weakened trade-unions and, consequently, damaged all the abovementioned drivers of innovation too. This negative impact

affected not just the plants of Riva di Chieri and Campi Bisenzio, which were closed, but some other Italian companies too. In this way, offshoring negatively affected the process innovation in the home country. This hypothesis has a lower level of certainty because, as said, the general Italian context was already leading to lower salaries, more unemployment, less training, and more unstable contracts. Nevertheless, the general context only challenges how much the two case studies impacted the Italian economy, not if they did it.

If the thesis has fulfilled its goal, exploring and confirming two new hypotheses, I must note that a vast part of these results would not have been detected without a qualitative method, based on two case studies and semi-structured interviews. Clearly, as mentioned before, any method has some imperfections, but in the complex, the choice of the method can be considered successful too.

The debate about offshoring's impact on innovation is extremely interesting and stimulating, although quite neglected. The use of a qualitative method, the *Labour-saving hypothesis*, and the *Trade-unions hypothesis* are the main contribution that this thesis can give to this debate. In this sense, I hope that this work has managed to push on the *research frontier* about this topic.

References

- Addison, J. T., & Wagner, J. (1994). UK unionism and innovative activity: some cautionary remarks on the basis of a simple cross-country test. *British Journal of Industrial Relations*, 32(1), pp.85-98.
- Allen, R. C. (2009). The British industrial revolution in global perspective. Cambridge University Press.
- Allen, T.J. (1977). Managing the flow of technology: technology transfer and the dissemination of technological information within the R&D Organization. Cambridge: MIT Press
- Arrighi, G. (1994). The long twentieth century: Money, power, and the origins of our times. New York: Verso.
- Bain, P., & Taylor, P. (2008). No passage to India? Initial responses of UK trade unions to call centre offshoring. *Industrial Relations Journal*, 39(1), pp.5-23.
- Balcet, G., & Ietto-Gillies, G. (2020). Internationalisation, outsourcing and labour fragmentation: the case of FIAT. *Cambridge Journal of Economics*, 44(1), pp.105-128.
- Baldwin, R. (2018). The Great Convergence. Cambridge: Harvard University Press.
- Barba Navaretti, G., & Falzoni, A. M. (2004). Home country effects of foreign direct investment., in G. Barba Navaretti, A. J. Venables (Eds.), *Multinational firms in the world economy*. Princeton and Oxford: Princeton University Press, pp.217-239
- Barbe, A., & Riker, D. 2018. The Effects of Offshoring on Domestic Workers: A Review of the Literature. *Journal of International Commerce and Economics*, Available online: <https://www.usitc.gov/journals>. [Accessed 16 May 2022].
- Bauducco, S. (2018), Marchionne gli operai fuori da Mirafiori “Dispiaciuti per la morte, ma aspettiamo ancora gli investimenti promessi”, 25 July 2018. Available online: <https://www.ilfattoquotidiano.it/2018/07/25/marchionne-gli-operai-fuori-da-mirafiori-dispiaciuti-per-la-morte-ma-aspettiamo-ancora-gli-investimenti-promessi/4515903/>. [Accessed 16 May 2022].
- Berend, I. T. (2016). An economic history of twentieth-century Europe: Economic regimes from laissez-faire to globalization. Cambridge: Cambridge University Press.
- Blanchflower, D. G., & Bryson, A. (2010). The wage impact of trade unions in the UK public and private sectors. *Economica*, 77(305), pp.92-109.
- Bloom, N., Van Reenen, J., & Williams, H. (2019). A toolkit of policies to promote innovation. *Journal of economic perspectives*, 33(3), pp.163-84.
- Buzzell, R. & Gale, B. (1987). The PIMS principles. New York: The Free Press

- Calabrese, G. G. (2020). The Italian automotive industry: between old and new development factors. In Covarrubias V, A., & Ramírez Perez, *New Frontiers of the Automobile Industry*, Cham: Palgrave Macmillan, pp. 163-201.
- Castaldi, C., & Dosi, G. (2006). The grip of history and the scope for novelty: some results and open questions on path dependence in economic processes. In *Understanding change*. Palgrave Macmillan, London, pp.99-128.
- Castellani, D., & Pieri, F. (2013). R&D offshoring and the productivity growth of European regions. *Research Policy*, 42(9), pp.1581–1594.
- Ceci, F., & Prencipe, A. (2013). Does distance hinder coordination? Identifying and bridging boundaries of offshored work. *Journal of International Management*, 19(4), pp.324-332.
- CGIL-FIOM. (2017). Available online: <https://www.fiom-cgil.it/net/index.php/elettrodomestici/embraco/4414-fiom-torino-oggi-sciopero-alla-embraco-di-riva-di-chieri>. [Accessed 16 May 2022].
- Cini, L. & Tassinari, A. (2021), *Insorgiamo*, Notes from below, 25 September 2021. Available online: <https://notesfrombelow.org/article/insorgiamo>. [Accessed 16 May 2022].
- Connolly, R. A., Hirsch, B. T., & Hirschey, M. (1986). Union rent seeking, intangible capital, and market value of the firm. *The Review of Economics and Statistics*, pp.567-577.
- Covarrubias V, A., & Ramírez Perez, S. M. (2020). Introduction: Changing Geographies and Frontiers of the Automotive Industry. In Covarrubias V, A., & Ramírez Perez, S. M, *New Frontiers of the Automobile Industry*, Cham: Palgrave Macmillan, pp. 1-38.
- Cramton, C. D. (2001). The mutual knowledge problem and its consequences for dispersed collaboration. *Organization science*, 12(3), pp.346-371.
- Cutro, F. (2021), GKN Todde “Ha preso 3 milioni di fondi dallo Stato, deve risponderne”, Rai News, 5 August 2021. Available online: <https://www.rainews.it/tgr/tosca/video/2021/08/tos-gkn-lavoratori-incontro-prefettura-fondo-melrose-cca2a8c7-e11d-4e76-8594-965d6d4743be.html>. [Accessed 16 May 2022].
- Daniele, G. (2011). A Pomigliano la Panda è di nuovo italiana, *Moto1*. 14 December 2011. Available online: <https://it.motor1.com/news/202777/a-pomigliano-la-panda-e-di-nuovo-italiana/#:~:text=Con%20la%20nuova%20Panda%20il,e%20nel%20nuovo%20Quality%20Center>. [Accessed 16 May 2022].
- Dachs, B., Borowiecki, M., Kinkel, S., & Schmall, J. (2012). *Global value chains and the EU industry*. Vienna: Vienna Institute for International Economic Studies.
- Dachs, B., Ebersberger, B., Kinkel, S., & Som, O. (2015). The effects of production offshoring on R&D and innovation in the home country. *Economia e Politica Industriale*, 42(1), pp.9-31.

- Daniel, W. W. (1987). Worker involvement in technical change. *Policy Studies*, 7(4), pp.43-57.
- De Luca Tamajo, R. (2015). Postfazione, in Rebaudengo, P. (ed.), *Nuove Regole in Fabbrica. Dal contratto Fiat alle nuove relazioni industriali*. Bologna: Il Mulino, pp. 99–110
- Dunning, J. H. (2015). Reappraising the eclectic paradigm in an age of alliance capitalism. In Dunning, J. H., *The eclectic paradigm*, London: Palgrave Macmillan, pp. 111-142
- Ebenstein, A., Harrison, A., McMillan, M., & Phillips, S. (2014). Estimating the impact of trade and offshoring on American workers using the current population surveys. *Review of Economics and Statistics*, 96(4), pp.581-595.
- European Central Bank. (2017). Available online: <https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/growth.en.html>. [Accessed 16 May 2022].
- Fana, M., Guarascio, D., & Cirillo, V. (2016). Did Italy need more labour flexibility?. *Intereconomics*, 51(2), pp.79-86.
- Fariselli, P. (2013). *Economia dell'Innovazione*. Torino: Giappichelli Editore.
- Fariselli, P. (2020). *La Cina nel Mercato Globale*. Bologna: SDIC.
- Ferrara, E. (2021). GKN quando il fondo Melrose scriveva “In cime a tutto il benessere dei dipendenti”, *La Repubblica*, 13 July 2021. Available online: https://firenze.repubblica.it/cronaca/2021/07/13/news/gkn_melrose_licenziamenti_fondo_britannico-310099188/. [Accessed 16 May 2022].
- Freeman, R. B., & Medoff, J. L. (1984). *What do unions do*. New York: Basic Books.
- Freeman, C., & Soete, L. (1987). *Technical change and full employment*. Oxford: Basil Blackwell.
- Galbiati, W (2015), Renzi e Marchionne cronistoria di un amore sbocciato un anno fa, 19 February 2015. Available online: https://www.repubblica.it/economia/2015/02/19/news/renzi_e_marchionne_cronistoria_di_un_amore-107687028/. [Accessed 16 May 2022].
- Ghidini, F. (2021), Il caso GKN spiegato dall'inizio e perché riguarda tutti noi, *Ultima voce*, 21 September 2021. Available online: <https://www.ultimavoce.it/caso-gkn/>. [Accessed 16 May 2022].
- Graf, M., & Mudambi, S. M. (2005). The outsourcing of IT-enabled business processes: A conceptual model of the location decision. *Journal of International management*, 11(2), pp.253-268.
- Graham Allison T. (1999). *Essence of decision*. New York: Pearson

- Green, F., Machin, S., & Wilkinson, D. (1999). Trade unions and training practices in British workplaces. *ILR Review*, 52(2), pp.179-195.
- Greve, H. R. (2003). *Organizational learning from performance feedback: A behavioral perspective on innovation and change*. Cambridge: Cambridge University Press.
- Griliches, Z. (1969). Capital-skill complementarity. *The review of Economics and Statistics*, pp.465-468.
- Griseri, P. (2011), Fiat Mirafiori dice sì a Marchionne, l'accordo promosso col 54% dei voti, *La Repubblica*, 15 January 2011 Available online: https://www.repubblica.it/economia/2011/01/15/news/mirafiori_dice_s_a_marchionne-11244909/. [Accessed 16 May 2022].
- Grossman, G. M., & Helpman, E. (2001). *Special interest politics*. Cambridge: MIT press.
- Grossman, G. M., & Rossi Hansberg, E. (2006). The rise of offshoring: it's not wine for cloth anymore. *The new economic geography: effects and policy implications*, *Journal of International Business Studies*, 18(2), pp.512-531.
- Harrison, D., & Laberge, M. (2002). Innovation, identities and resistance: The social construction of an innovation network. *Journal of Management Studies*, 39(4), pp.497-521.
- Harrison, A. E., & McMillan, M. S. (2006). Dispelling some myths about offshoring. *Academy of Management Perspectives*, 20(4), pp.6-22.
- Hicks, J. (1963). *The theory of wages*. New York: Springer.
- Howells, J. (1996). Tacit knowledge. *Technology analysis & strategic management*, 8(2), pp.91-106.
- Iammarino, S. (2005). An evolutionary integrated view of regional systems of innovation: concepts, measures and historical perspectives. *European planning studies*, 13(4), pp.497-519.
- Ietri, D. (2010). A city loses its major industry—what does it do? The case of Turin. In Kresl, D., *Economic Strategies for Mature Industrial Economies*. London: Edward Elgar Publishing, pp.160-181.
- Jahns, C., Hartmann, E., & Bals, L. (2006). Offshoring: Dimensions and diffusion of a new business concept. *Journal of Purchasing and Supply Management*, 12(4), pp.218-231.
- Jensen, P. D. Ø. (2009). A learning perspective on the offshoring of advanced services. *Journal of international Management*, 15(2), pp.181-193.
- Kaldor, N. (1960). *Essays on Economic Stability and Growth*. London: Duckworth

- Karpaty, P., & Tingvall, P. G. (2015). Offshoring and home country R&D. *The World Economy*, 38(4), pp.655-676.
- Kline, S. J., & Rosenberg, N. (1986). An Overview of Innovation, in Rosenberg, N., & Landau, R. (Eds.). *The Positive sum strategy: harnessing technology for economic growth*. Washington DC: National Academies Press., pp.173-203
- Ketokivi, M., & Ali-Yrkkö, J. (2009). Unbundling R&D and manufacturing: post-industrial myth or economic reality? *Review of Policy Research*, 26(1–2), pp.35–54.
- Kotabe, M. (1990). The relationship between offshore sourcing and innovativeness of US multinational firms: An empirical investigation. *Journal of International Business Studies*, 21(4), pp.623-638.
- Leonard-Barton, D. (1992). The factory as a learning laboratory. *Sloan Management Review*, 34(1), pp.23–38.
- Lewin, A. Y., & Peeters, C. (2006). Offshoring work: business hype or the onset of fundamental transformation?. *Long range planning*, 39(3), pp.221-239.
- Markusen, J. R. (2002). *Multinational firms and the theory of international trade*. Cambridge, Mass and London: MIT Press.
- Marsala, V. (2021), Il Gruppo Borgomeo rileva la GKN e finisce l’incubo licenziamenti, 23 December 2021, Available online: <https://www.agi.it/economia/news/2021-12-23/gkn-borgomeo-rileva-azienda-stop-licenziamenti-15009957/>. [Accessed 16 May 2022].
- Martini, F. (2016), Renzi contro Landini “I sindacati difendono la casta, non i lavoratori”, 29 November 2016, Available online: <https://www.lastampa.it/politica/2016/11/29/news/renzi-contro-landini-i-sindacati-difendono-la-casta-non-i-lavoratori-1.34774870/>. [Accessed 16 May 2022].
- Marx, K. (1992). *The Capital: Volume I, II, and III*. London: Penguin UK.
- Max Planck Institute (2021). Available online: <https://www.mpifg.de/994356/baccaro-tassinari-italienische-eliten>. [Accessed 16 May 2022].
- Mazzanti, M., Montresor, S., & Pini, P. (2009). What drives (or Hampers) outsourcing? Evidence for a local production system in Emilia-Romagna. *Industry and Innovation*, 16(3), pp.331–365.
- Menezes-Filho, N., & Van Reenen, J. (2003). Unions and innovation: a survey of the theory and empirical evidence. Available online: www.cepr.org/pubs/dps/DP3792.asp. [Accessed 16 May 2022].
- Migone, G. G. (1974). Stati Uniti, Fiat e repressione antioperaia negli anni cinquanta. *Rivista di storia contemporanea*, 3(2), pp.232-248.

- Mihalache, O. R., Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2012). Offshoring and firm innovation: The moderating role of top management team attributes. *Strategic Management Journal*, 33(13), pp.1480-1498.
- Moxon, R. W. (1975). The motivation for investment in offshore plants: The case of the US electronics industry. *Journal of International Business Studies*, 6(1), pp.51-66.
- Naghavi, A., & Ottaviano, G. (2009). Offshoring and product innovation. *Economic Theory*, 38(3), pp.517-532.
- Nemeth, C. J. (1997). Managing innovation: When less is more. *California management review*, 40(1), pp.59-74.
- Ng, T. W., & Feldman, D. C. (2010). The relationships of age with job attitudes: A meta-analysis. *Personnel Psychology*, 63(3), pp.677-718.
- Nübler, I. (2016). New technologies: A jobless future or golden age of job creation. International Labour Office Research Department Working Paper, 13, pp.22-23.
- OECD, (2021). Economic Surveys Italy. Available online: <https://www.oecd.org/economy/surveys/Italy-2021-OECD-economic-survey-overview.pdf>. [Accessed 16 May 2022].
- Oldenski, L. (2014). Offshoring and the polarization of the US labor market. *ILR Review*, 67(3), pp.734-761.
- Pianta, M. (2005). Innovation and Employment, in J. Fagerberg, D. Mowery, & R. Nelson, *Handbook of Innovation*, Oxford: Oxford University Press, 2005, pp.568-598.
- Pisano, G., & Shih, W. C. (2012). Does America really need manufacturing? *Harvard Business Review*, 90(3), pp.94–102.
- Revelli, M. (1989). *Lavorare in FIAT* (Vol. 27). Milan: Garzanti.
- Rosenberg, N. (1963). Capital goods, technology, and economic growth. *Oxford Economic Papers*, 15(3), pp.217-227.
- Rothschild, K. (1956). *The Theory of Wages*. Oxford: Blackwell
- Sbordoni, G. (2022). Storia di un fallimento politico, *Collettiva*, 22 January 2022. Available online: https://www.collettiva.it/copertine/lavoro/2022/01/22/news/embraco_storia_di_un_fallimento_politico-1803447/. [Accessed 16 May 2022].
- Schumpeter, J. A. (1983). *The Theory of Economic Development*. New York: Routledge
- Schumpeter, J. A. (2010). *Capitalism, socialism, and democracy*. New York: Routledge.

- Shan, W., & Song, J. (1997). Foreign direct investment and the sourcing of technological advantage: evidence from the biotechnology industry. *Journal of International Business Studies*, 28(2), pp.267-284.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, 70(1), pp.65-94.
- Statista. (2020). Available at: <https://www.statista.com/statistics/531010/unemployment-rate-italy/>. [Accessed 16 May 2022].
- Statista. (2021). Available at: <https://www.statista.com/statistics/765482/india-number-of-students-enrolled-in-engineering-stream-by-discipline/>. [Accessed 16 May 2022].
- Teece, D. J. (1996). Firm organization, industrial structure, and technological innovation. *Journal of economic behavior & organization*, 31(2), pp.193-224.
- Treccani (2021). Available online: https://www.treccani.it/enciclopedia/il-miracolo-economico-italiano_%28Il-Contributo-italiano-alla-storia-del-Pensiero:-Tecnica%29/. [Accessed 16 May 2022].
- Valle, S., García, F., & Avella, L. (2015). Offshoring intermediate manufacturing: boost or hindrance to firm innovation? *Journal of International Management*, 21(2), pp.117-134.
- Vernon, Raymond. 1974. The location of economic activity in economic analysis and the multinational enterprise. In J.H. Dunning, ed., *Economic analysis and the multinational enterprise*, London: George Allen & Unwin, pp.89-114.
- Villari, L. (1995), Mussolini contro Agnelli la lezione della storia, La Repubblica, 18 December 1995. Available online: <https://ricerca.repubblica.it/repubblica/archivio/repubblica/1995/12/18/mussolini-contro-agnelli-la-lezione-della-storia.html>. [Accessed 16 May 2022].
- Vivarelli, M. (2013). Technology, employment and skills: an interpretative framework. *Eurasian Business Review*, 3(1), pp.66-89.
- Vivarelli, M. (2014). Innovation, employment and skills in advanced and developing countries: A survey of economic literature. *Journal of Economic Issues*, 48(1), pp.123-154.
- Vivarelli, M. (2015). Innovation and employment. IZA World of Labor. Available online: <https://wol.iza.org/articles/innovation-and-employment/long>. [Accessed 16 May 2022].
- Wallerstein, I. M. (1999). The end of the world as we know it: Social science for the twenty-first century. Minneapolis: University of Minnesota Press.
- Wang, L., Yeung, J. H. Y., & Zhang, M. (2011). The impact of trust and contract on innovation performance: The moderating role of environmental uncertainty. *International journal of production Economics*, 134(1), pp.114-122.

Welbourne, T. M., Johnson, D. E., & Erez, A. (1998). The role-based performance scale: Validity analysis of a theory-based measure. *Academy of management journal*, 41(5), pp.540-555.

WIPO (2021). Available online: https://www.wipo.int/global_innovation_index/en/2021/. [Accessed 16 May 2022].

Youngdahl, W., & Ramaswamy, K. (2008). Offshoring knowledge and service work: A conceptual model and research agenda. *Journal of operations management*, 26(2), pp.212-221.

Žuk, P., & Žuk, P. (2018). Offshoring, labour migration and neo-liberalisation: nationalist responses and alternatives in Eastern Europe. *The Economic and Labour Relations Review*, 29(1), pp.97-117.