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TESI DI LAUREA

"Manufacturing and Internationalization
***The strategic role of manufacturing in a multinational company: The case of Crocs Inc.*"**

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Summary

Introduction

The thesis will explore the role played by manufacturing in the internationalization of a company.

At first will be consider the manufacturing function by itself in relation to company's strategy and the others functional activities, and, once defined that, how to elaborate and assessing if the current manufacturing strategy is coherent at company and, ultimately, at firm level. Then, moving to a managing, more concrete perspective, the manufacturing will be explored in the operational aspects, that are how and why locate in certain areas, also evaluating make vs. buy alternative, pondering need of flexibility against the possibility of develop capabilities that would eventually bring innovation to the process or the product itself.

Then, for touch deeply the innovation matter in relation to manufacturing, R&D activity will be analysed, even in this case by considering the different method to manage such function, due to company's needs, and challenges that firms have to face according to the nature of the research or development practice.

At that point, links between manufacturing and R&D will be presented, first on a theoretical aspects, and then analysing case studies that report on real cases for determine common pattern.

The discussion of the themes mentioned will enable an in depth and objective analysis of the case experienced directly by the author: Crocs Inc.

A description of the production and R&D process will allow understanding the position and performances of such a company in the fashion industry, evaluating even possible divergences with the model regarding the management of these function described by academics.

The case seems interesting and worthy to be analyse due to its peculiar characteristic.

1. Manufacturing and Internationalization

1.1 Introduction

The aim of this chapter is to present the main theories for strategic choice making and their implications regarding Value Chain's management, in particular focusing on Manufacturing.
Given the subject of the dissertation, it seems essential to review the literature in that specific area for two reasons: first, provide a presentation of the tools that are adopt for the analysis of the case study in the last chapter and, second, it is important to retrace the milestones achieved throughout the years by both practitioners and academics.
The argumentation, although the chapter's title might suggest a further consideration of the other binomial's part, will immediately start by taking a strong position with regard to the term "*Internationalization"* referred to "enterprise". In fact, anyhow the term is interpreted:

- *Internationalization* of a company according to the fact that it compete in an international market
- *Internationalization* under the operational aspects if it performs activities through proprietary assets offshore the country in which it incorporated

It is actually a consequence of a strategical decision: in the first case, there might be, for example, a relatively strong product differentiation, a good marketing strategy and a good network of distribution all combined, in the second case, could be either a cost-saving driven decision or a "quality matter" decision.
In this sense, nowadays the major limit to the internationalization appear to be a cultural matter, followed by the management capability and financial constraints, because even SMEs have tools for managing relation with foreign counterparts (Caniato et al. (2013)).

These are all topics covered further in the dissertation but was fundamental, in the opinion of the writer, to make such a statement on that. The approach to the "manufacturing matter" must have a central role in the mind of the reader so as it is in the following pages, leaving aside any other consequences that derive from the management of it, such as the internationalization.

The first chapter will hence covers the following topics, respectively in that order:

- Definition of "manufacturing strategy" and exposition of a methodology to formulate it, mainly based on the work of Charles H. Fine and Arnoldo C. Hax (*Manufacturing Strategy: a Methodology and an Illustration*, June 1985, Sloan School of Management archive);
- Presentation of a case study on companies operating the fashion industry, done by F. Caniato, L. Crippa, M. Pero, A. Sianesi and G. Spina that explore the different ways by which both Italian and foreign companies manage operation (also manufacturing), even differently within the same company according to specific issues, and find a paradigm to explain it (*Internationalisation and outsourcing of operations and product development in the fashion industry*, February 2015, Production Planning & Control)
- Presentation of further specific issues on the "Manufacturing Strategy" matter and how it was reviewed from the academics 11 years later from the paramount milestone of Fine and Hax, by extracting the main ideas from a work by Robert H. Hayes and Gary P. Pisano that aim to find a link between "Manufacturing Strategy" and "Competitive Strategy" (*Manufacturing Strategy: at the Intersection of two Paradigm Shift*, Production and Operation Management, vol. 5, No. 1, Spring 1996)
- Sum up and discussion on the main topics and findings followed by a brief introduction to the next chapter, highlighting the links between the core ideas on manufacturing strategic choices and R&D and Product Development

The agenda proposed reflect the intention of approaching the manufacturing problem using different type of document but their nature reflect a specific purpose in the argumentation, the following schema will effectively represent the writer's idea (*Figure 1*):

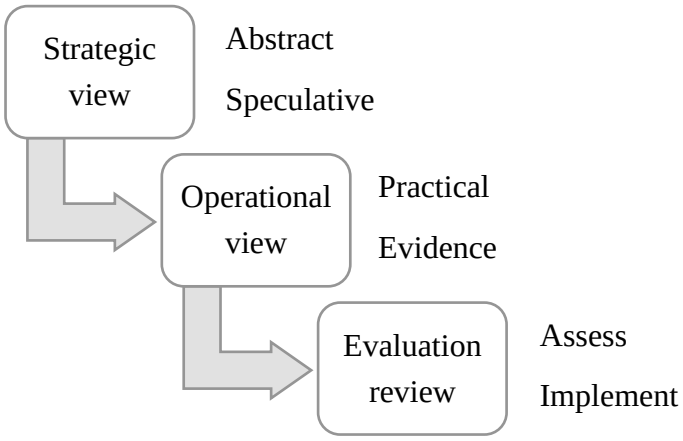


Figure 1

Topic's approach method.

1.2 Manufacturing Strategy

1.2.1 Defining the concept

Before approaching the subject, it is useful to recur to a definition of "Manufacturing Strategy formulation" that will later help in defining the concept:

"…what a firm wants is to create a situation where its own resource position directly and indirectly makes it difficult for others to catch up".

- Wernerfelt (1984) cited in Singh and Mahmood (2013) -

This definition gives two hints on the implication of adopting a strategy for the manufacturing function. First, it explicitly anticipate Porter's theory of *Competitive Advantage* formulated in 1985 and, on second hand, together with the latter, lay the foundation for the "VRIO" analysis framework which allows the assessment of company's resources and their role in securing a position of advantage towards the competitors (Barney (1991)).
Manufacturing is treated as resource: it can be valuable, rare, difficult to imitate and properly exploited by the organization.
Manufacturing is a difficult corporate's function to manage, numerous are the studies on this field and even numerous are the peculiarities according to the industry, but, since it is not the scope of the current argumentation, those assessments are useful to assert that manufacturing has a central role in whatever it is the company involved in producing and selling goods.
Therefore, a definition for manufacturing strategy can be the following:

"A strategy that, considering the threats and opportunities at business level, match, develop and manage the manufacturing activity pondering corporate's weaknesses and strength in order to achieve and maintain a position of sustainable advantage"

It appear more reasonable now the position of the writer according to the "internationalization matter" expressed at the beginning of the chapter. Internationalization is clearly a consequence of the choices that the firm does in order to pursue its strategy, a strategy that, according to the view of Fine and Hax, must put at the centre of the formulation the manufacturing.

1.2.2 The Strategic role of Manufacturing

The management of the manufacture cannot be lead only by traditional or simplistic calculation that take into account factors that looks within the function, but must be a sort of concertation of all the functions that belongs to the company (Fine and Hax (1985)), that are: finance, marketing, engineering and R&D, HR, purchasing and so on.

This is because decision taken in the manufacturing directly affect these other functions: for example, adopting a new machinery for a specific phase of the production may require the hiring of specific highly educated personnel, but is that personnel available in the region where is located the production plant? How can the HR department satisfy this need? There must be a consistency and feasibility among the overall objectives.

Managers should look with one eye at manufacturing and with the other at the market and competitors: should be produced and/or made investments for the production of a good that is extremely expensive, due to its technological content, but is experiencing high success on the market? It depends, surely confronting with the other functional groups within the firm may help in the decision. An evaluation with the R&D and the marketing team may define whether the possibility to fit the product into the umbrella of company's brand or even possible developments of the market's scenario and hence defining a differentiation strategy (that is actually responding to the competitors' manufacturing strategy).

Manufacturing, hence, affect and is affected by the internal environment (other functional activity) and the external environment (market ad competitor).

Before showing where to start for build-up a Manufacturing strategy, it is paramount to set the proper point of view for taking into account all the factors that exert a force towards the firm.
At which level does the management has to design the manufacturing strategy? Is the production manager charged of this responsibility? Or the Chief Operation Officer? Maybe the Product Manager?

The answer is that an effective strategy design, especially for manufacturing, take into consideration the different layers by which the organization is made, providing a coherent and detailed program for each one of them (Fine and Hax 1985).

Fine and Hax identify three hierarchical level that the production function affects and hence must be supported with 3 different strategical plans coherent among each other:

1) Corporate

Formulation of the vision: corporate's philosophy, mission definition strategic business unit and their interaction and set the strategic posture and planning guidelines.

2) Business

Defining the mission of the business: business scope and identification of product-market segment and formulation of a business strategy and broad action program

3) Functional

Formulation of a Functional Strategy by the participation to the business planning and definition and evaluation of specific action programme

Commonly, the setting of the strategy take place at the highest level, and the strategic planning is a complete and accurate specification of all the effort that the organization has to put in place to complete specific tasks, also providing a sequence in which the latter has to be completed (Fine and Hax (1985)).

Moreover, the strategic planning that take place at the corporate level identifies a role and a target objective for each function, in such a way, every function focus on a specific task that, combined timely and all together, allows a competitive superiority (Fine and Hax (1985)).

Manufacturing should pursue, along with the other function, the corporate objectives. According to the literature, the production's objectives are measured with four standard indicator of performance (Wheelwright (1981)) cited in Fine and Hax (1985)):

Costs, which include the cost of labour, cost of raw material, capital productivities, inventory turnover etc. This dimension is commonly in the discussion of the top management, especially in the last decade where has been experienced a phenomenal offshoring practice towards country with lower income.

Quality, which include the percentage of defective finish good, cost of quality, failure rate in output per production phase and mean time between failures. High level of quality, even if not alluded by Wheelwright in its work, when tightly linked to the expected product's features of identification and authenticity by the customers, it is an extremely sensitive variable for those

companies that in their manufacturing process rely more on the ability of the artisan then on the level of technological equipment.

Time to delivery, can be measured by calculating the percentage of on-time shipment, consequent average delay, calculation of lead-time and expediting response time. This evaluation dimension is strongly affected by the planning activity and the management of market demand: better produce to stock or, from trimester to trimester, schedule the production according to the "Sell Order Forecast" joint with the "New Current Order"?

Flexibility, or else the ability to enlarge or narrow the portfolio of products and the time that it takes to do such that adjustment, none the less the flexibility in term of volume production. The level of flexibility depends by the characteristic of the product and the constraints given by the equipment and labour force.

Is it mandatory or even possible for a company to excel in all these dimensions?

The answer is not trivial. Of course, there are trade-off to make between the four dimensions, even though some researchers argue that it is not true at all (see the last part of the chapters, where there is a revision of "Manufacturing Strategy" from Pisano and Hayes).

The correct questions to ask are: in which dimensions should production excel in order to serve the strategy at company level? Focusing on the improvement of that dimension/s allow the company to adjust its scope and structure in the next years if required?

At the end it is a matter if fit between the strategy formulation at all level, Corporate, Business and Function.

1.2.3 Strategic Decision Categories for decision making

The process of forming a Manufacturing Strategy imply that before has been analysed the multiple issues that belong to the production process itself. For an effective and clear representation of all the facets, are proposed here after nine categories (Fine and Hax (1985)):

Facilities are those that usually affect in the long-term the operation of a company. The problem of managing properly the facilities relate more those companies that has a multiple plants around the globe. These organizations have to decide how to focus their facilities, that is subdivide the product's portfolio according to a specialization in order to enjoy saving thanks to economies of scale, scope, or distribution (Skinner (1974), Hayes and Schmenner (1978) cited in Fine and Hax (1985)).

The subdivision of the production's volume among the plants can follow the following criteria of focusing:

a) *Geography*

This choice is quite intuitive to understand, an example could be a company that produce food in different countries but with different brands. The products' offer in the two markets is almost the same in features and variety, let's assume 20 kinds, but since its perishable nature, the organization is obliged to manufacture the products in 2 identical plant without the possibility of attain economies of scale subdividing 10 in one and 10 in the other.

b) *Products Group*

High-end fashion brand usually has a complete set of items in their collection: from shoes, to apparel and accessories. There is an affinity between the materials required to produce some these goods: belts, bag and shoes use the same fabric usually, so this subset of item can be focused in a plant near to the suppliers or in the region where there is skilled and specialized labour force for that specific raw material.

c) *Process type*

Some processes are illegal in some country and legal in other (eg. special treatment on fabrics with plastic), so that, for the manufacture of a product, a company may be force to group all the products that require that specific treatment and send them for that intermedium of final phase to that plant.

d) *Volumes*

A firm may subdivide product among its facilities according to market's demand in term of quantity, the most demanded or the top two will be produced in the plant with biggest capacity if they are homogeneous in production phases'.

e) *Stage in the product lifecycle*

This is quite an interesting one, because this allocation criterion is particularly indicated for those industries that face a rapid change in the market's trend. An example could be an electronics components firm that has to catch up with the competitor or with the technological innovation. It will subdivide the product's offer by the stage in which they are in the product's lifecycle, moving to the

smallest factories, but richer in term of competence and equipment, the new products that require prototyping and still face a low demand.

Capacity must be considered at the overall level of the organization and, most important, it include the reasoning done around the "facility matter" and juxtapose it to the aforementioned two other important determinants of a firm's capacity: Equipment and Human Capital. Fine and Hax remind to always consider competitors' capacity to guide own strategical decision at the corporate and then at functional level in order to be competitive.

Vertical Integration thorough acquisition is desirable when the market mechanism does not satisfy the need of the client, which could be a lack in term of quality, time to delivery or capacity to innovate from the side of the supplier.

Other factors have to be considered when taking such a decision: first one, the possibility to make an investment, if the firm can effectively govern the new mechanism of coordination (either acquisition or entering the business of the supplier) according to its managerial competence and capability. The case of Toyota however show that the ownership might not be necessarily the solution to better coordinate with the supplier and in general with the supply chain: Toyota in fact made an agreement with its supplier to have a huge role in managing and directing their operation and so overcoming the problem on the upstream side.

Process is influenced by the **Technologies** available to the firm but first there must be a match between the products and the applied process, the latter can be afterward implemented investing in technological equipment. The four big families in which can be enclosed almost all of the production processes are (see *Figure 2* for understanding the impact on cost and constraints in term of product's variety):

a) Project
b) Job shop
c) Assembly Line
d) Continuous Flow

The introduction of a new technology, regardless of the kind of process in which is adopted, change the structure of the cost of the production in a disruptive way, making it mandatory to train or rethink the amount of labour force adopted.

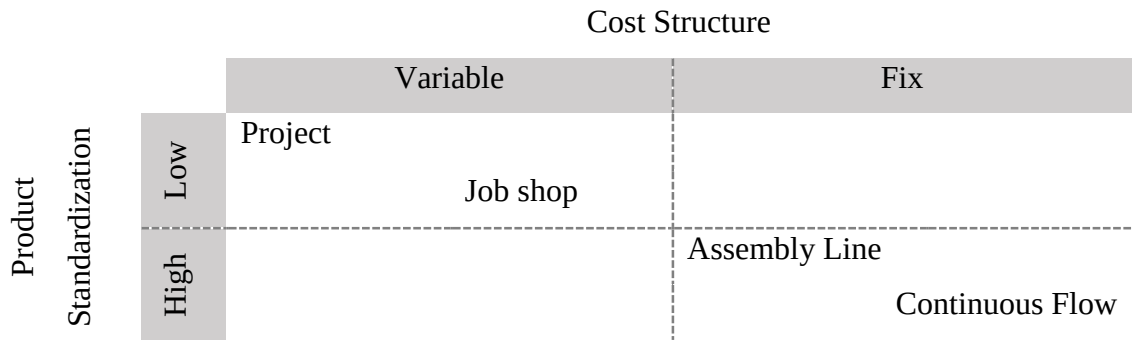


Figure 2

Production process standardization and cost structures. Adopted from Fine and Hax (1985).

Both the **Scope** of the processes involved in the production and the rage of products that has to be produced directly made more difficult to manage the manufacturing because those two dimension amplify the complexity (Skinner (1974) cited in Fine and Hax (1985)). In a business where new product are introduced overtime there has to be a flexible, responsive and efficient manufacturing organization but non only: recalling the concept expressed in the previous part of this chapter, there has to be also a design/product innovation team capable of understanding the implication of their design choices and their limitation.

In a production system, **Quality Management** is relevant even in the possible lowest category of product, so it's important to properly allocate the responsibilities to each actor involved in the process. Measurement system must be implemented in order to exert a constant control and find possible systematic errors. Moreover, the quality management, as evolve the technologies adopted and product's features and characteristics, is a continuous developing process.

The **Infrastructure** provide a hierarchical level for properly allocate responsibility and all of the different tasks that have to be carried out according the normal routine of the organization but also those who has to take the decision if critical circumstances occur. Moreover, the organizational infrastructure determine how the different function will perform their task and with who they will have to coordinate more frequent (who, what, when, how, with who).

Moving on a narrow scale, the functional level of manufacturing, the decision that has to be done on the infrastructure can be reassumed in material management, production planning, scheduling and control.

Relations with Supplier become more relevant to the management when the suppliers fail in providing the service or product in the manner or in the time required. In the literature, there are two approaches to exert influence on the counterpart, and, even though opposite, they have shown to be effective.

The first, proposed by Porter, in 1980, suggest developing a multiple source for the production input, so that, suppliers will compete among each other to provide the best product/service at the best price and the customer can switch at any time to the best offer.
The other method find its roots in the Japanese culture (Schonberger (1982) cited in Fine and Hax (1985)) and is the so-called "cooperative" approach. The relationship developed between customer and supplier is based on a long-term horizon and on mutual trust. If the performances are not satisfactory, the customer provide feedback and even special training if required.
Under the restrict perspective of the management of **Human Resources**, many studies has highlighted the difficulty of findings an efficient retribution scheme. Of course, even in this case, the incentive/retribution must be align to characteristic of the production process so that to obtain the desired outcome from the manufacturing function.
If the matter are the knowledge and the skill of the labour force, the management should define a method to transmit that know-how to the new and youngest employer, especially ideating an effective coaching programme were the old and expert personnel teach to the new one. If those skills do not require such a long time to be transmitted but are still relevant, maybe setting the manufacturing stage in a region where those skill are available, for cultural or historical reason, could be the key to success.

1.2.4 Structuring the Development of a Manufacturing Strategy

After the presentation of the nine categories to consider when involved in a decision-making process, concerning manufacturing and the three level on which that decisions take place, here after is reported a quick schema that is a methodology for structuring the development of Manufacturing Strategy (Fine and Hax (1985)).
This tool will be adopted in the last chapter when confronting the case study of the dissertation with the literature review and the methodologies proposed in the various paper.

1. Provide a Framework for strategic decision making in manufacturing
    a. Make an assessment for each of the nine categories for decision making
    b. Measure Manufacturing Strategic Performance
        i. Cost
        ii. Quality
        iii. Time to delivery
        iv. Flexibility
2. Assure linkage between Business Strategy and Manufacturing Strategy

3. Conduct an initial Manufacturing Strategic Audit
    a. Detect strength and weaknesses in the current manufacturing strategy by each decision category
    b. Asses the relative standing of each product line regarding the strategic performance measurement against the most relevant competitor
4. Address the issue of product grouping
    a. Positioning the product lines in the product process lifecycle
    b. Assessing products commonality of performance objective and product family mission
5. Examine the degree of focus present in each plant
6. Develop manufacturing strategy and suggest allocation of product lines to plans

1.3 Operation Management - Insights on Manufacturing

1.3.1 Introduction

The following case study was chosen for treating the topic of the operative management of manufacturing and supply chain for several reason:

a) It provide empirical evidence of the fit between the organizational need and the strategy adopted at functional level;
b) It provide material for further consideration on the operational aspects of the manufacturing, hence moving from an initial strategical (abstract in some sense) to a more practical approach to the matter;
c) Explore the theme of Internationalization of Operation and define the related drivers
d) Explore and anticipate the theme of Internationalization of R&D and Product Development of the next chapters
e) It anticipate the case of the dissertation, the company that will be analysed later in fact operate in the same industry (Fashion) and so it may be easier to set the "Operational Framework" of analysis starting from a paper that analyse similar companies.

The paper by Caniato et al. analyse the outsourcing decision vs. the adoption of an internationalization path with regard to operation and the product development; investigate the collaboration practices internal the company (manufacturing and design) and external (with supply chain partners); identification of the factors that affects the adoption of different

configuration of operation and collaboration practice. For the aim of this chapter however will be considered only the part for the understanding of the Strategic choice linked to the Operation, that is the manufacturing matter and how it is managed.

1.3.2 Research Framework and Methodology

The research framework define the aspects that the authors want to investigate and propose a classification for measuring how those aspects develop or change according to different variable.

In this case, for understanding the outsourcing process, three alternative are given in determining the degree of a brand-owning company in relation to the production and the purchasing (*Figure 3*).

Operations	Description
Full Insourcing	Sourcing of raw material and production activity are managed by the brand-owning company
Subcontracting	Raw material sourcing activity is done internally while production is outsourced to supplier
Full Outsourcing	Both sourcing the material and the production are carried out by the supplier

Figure 3

Outsourcing alternatives. Adopted from Caniato et al. (2013).

The outsourcing determine a level of complexity in term of the network that have to be managed: in the work by Caniato there are two basic distinction to classify the complexity: it is defined “simple” if there are few but large supplier or “complex” if there are numerous and small.

The network to manage encompasses not only the actors outside the company but even the other functions within the enterprise. These relationship in turn determine a certain level of collaboration if the task to be accomplished is critical or not for the firm, also this dimension, moreover, is evaluated with two levels: it could be a “strong” or a “poor” level of “collaboration”.

The authors supposed that there is a link between the level of collaboration and the outsourcing/internationalization practice adopted; more precisely, they infer that the first one

derive from the latter, and the latter is in turn determined by how critical is that activity to the firm and the need of flexibility (*Figure 4*).

Figure 4

Determinant of outsourcing mode and level of collaboration. Adopted from Caniato et al. (2013).

For sake of accuracy on the meaning of "critical" in this context, the activities are labelled as such if they affect in a wrong way the features of the product, in fact, a lack in term of quality can reverberate at the collection level or even impair the positioning of the brand, hence, size and competence of the supplier matter.
In this part of the thesis, even though the argument will be reprise, there is a focus on the two following question:

What drivers influence companies' decisions in terms of internationalisation and outsourcing of operations? And how does the decisions regarding internationalisation and outsourcing of operations affect the level of collaboration among companies in the fashion supply chain?

Before discussing the results, appear fair to reassume in short the methodology adopted, also because it will give a further contribution to the discussion of the manufacturing matter in a strategic perspective.
The six brand-owning companies interviewed were from the majority from Italy, one from Germany and another from the United Kingdom. These firms also operate in different segments within the industry. The sample is quite heterogeneous if taking into account that the size in term of revenue and employees differ very much, but this actually permit to make another consideration: whether if size does affect the internationalization mode too.
Interview has been made with all the actors that in the companies play a role in managing the external supply chain an also with those who has to exchange information concerning specific or particular request that affect manufacturing phases.

The final dataset on which are based the conclusion are groups of product. These groups are distinct from the others according to the way in which is managed their supply chain, and this has a relevant implication: the final dataset constitute of ten different product groups.
How can this be possible if the companies under investigation where six?
That is because within the same organization, different kind of products are managed differently. That is not surprising on a second thought: for sure a brand that offer to its customers a wide range of goods, from accessories (glasses, leatherwear, watches, clothes, shoes, etc.) don't have the same supply chain and neither the same production processes.

1.3.3 Results and Discussion

I order to give sense to the data gathered, Caniato at al. decide to subdivide the outsourcing of activity in three geographical macro-categories (location of operation) to see if there were elements of communality among product group within the categories.
The three macro-categories are reported here after and for each one are indicated the drivers shared by the product groups that belong to it:

1. Local level (from region to country)
   Firms subcontract production to many small suppliers and keep the purchasing activity inside to assure the quality and the price of raw material and have a big bargaining power.
   The drivers are:
   a. Keep a strong control on quality
   b. Place the label "made in Italy" on their products
   c. Need of reactivity for market changing demand, not possible with counterparts too far

2. Regional Level (from country to continent)
   Firms in this category both subcontract and full insource the operation, they actually try to find a balance adopting this hybrid approach.
   The drivers are:
   a. Need to control manufacturing activity directly for assure quality
   b. The need for a rapid adjustment to exchanging demand. The regional configuration in fact allow to exploit different economic situation compare to

the countries in which afterward will be realized the sell, that is, in some case, the advantage of a cheap labour force

3. Global level (from continent to globe)
   Organization that mange goods at this level full outsource their operation. The advantages are that, given the nature of the products (diffusion and no need for country market customization), thorough the consolidation of the volume of the production inputs, huge saving are achieved and the need of control is overcome placing high quality standard to the manufacturers.

The schema (*Figure 5*) help in the visualization of the outcome of the research done by Caniato et al. and actually reinforce the position of the writer expressed at the beginning of the chapters: Internationalization is a consequence of the strategic management of the manufacturing and the supply chain, limited only by the possibility/convenience of invest and the management's capability.

In order to unify and reassume the contributions on the Manufacturing topic by the Americans and Italian researchers can be asserted that:
Initially, but also periodically during the lifetime of the company, there should be a strategic approach to the function, the latter has to be evaluated overtime according to the criteria that best fit the purposes of the company (cost, quality, time to delivery, flexibility).
The management of the function derive from the nine criteria aforementioned, and these choices regard both the allocation of the products portfolio among the factory and the location of the factory itself.
In addition to the last assertion, the empirical study by Caniato also add that internationalization, if the operations carried out by the parent entity across the national border, not necessarily happens by the establishment or the acquisition of a subsidiary, but can be done through the subcontracting of certain activities or fully outsourcing the production of the product.
The last two choices require less capital to invest and allow more flexibility in several dimensions, and so are a preferable path to take by the newcomers, but other hand, they require different characteristics according to the positioning of the product: Seasonal and/or handcrafted products requires flexibility and specialized personnel. The risk of lost sell is very high and so a high level of control is required. Therefore high level of collaboration among internal and external actors take place, it is further amplified if the network is complex.

Products with high diffusion, identical characteristic across all markets and replicable production processes facilitate the work of the firm, which can outsource the full production and guarantee a standard level of quality by setting minimum threshold for its supplier. The only constrain its bargaining power.

The last section of the chapter will review the treated topics since so far under a new perspective, followed by some conclusive thoughts to consolidate the argumentation and introduce to the new chapter.

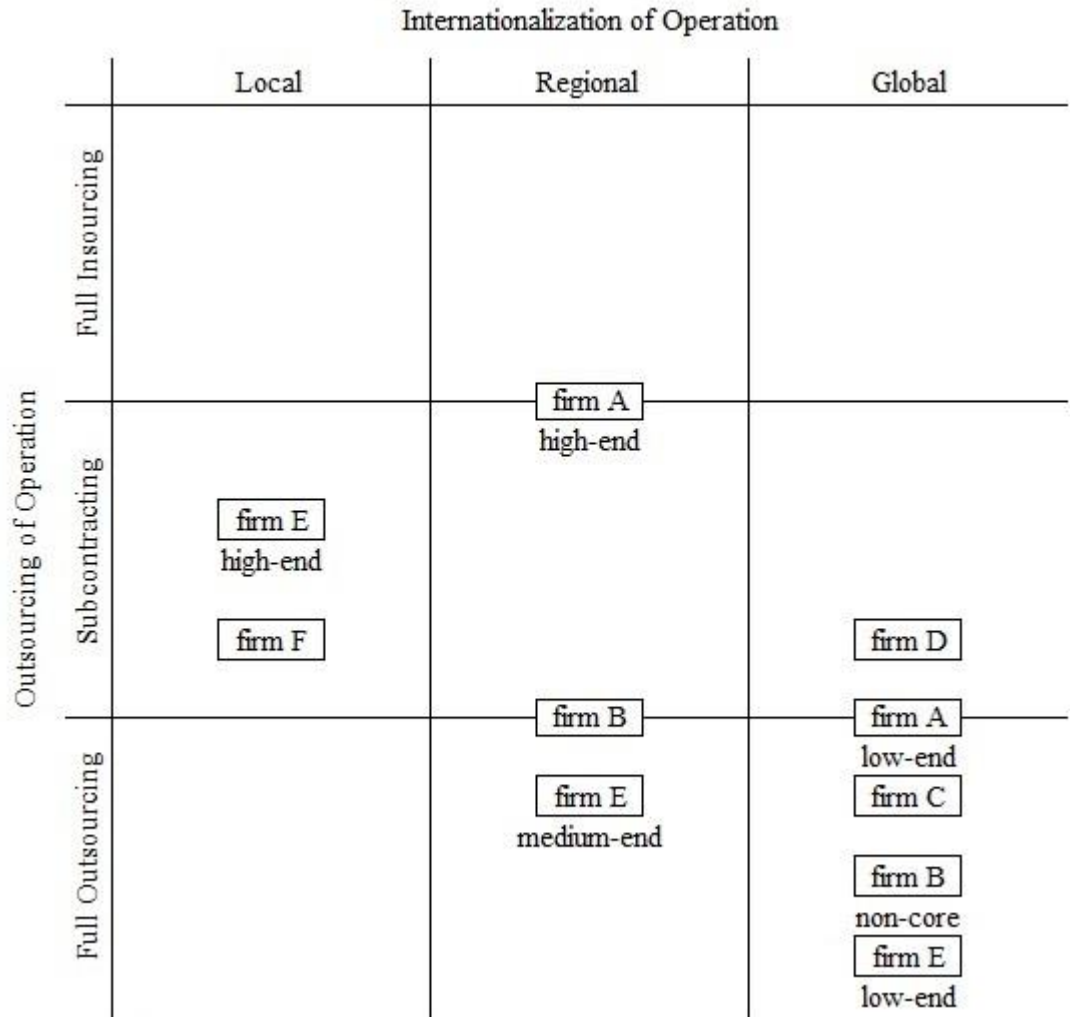


Figure 5

Visual representation of the firms outsourcing choices in relation to the degree of internationalization. The rectangles in the figure are the products group labelled with the firms that "own" it, under is also specified the positioning of that group of products. Adopted from Caniato et al. (2013).

1.4 A New Perspective on Manufacturing Strategy

1.4.1 Performance Trade-off and Skill Development

Deepening on the topic of the four dimension to take into account when evaluating the manufacturing function was previously stated that a trade-off was necessary. Hayes and Pisano on the other hand suggest that actually, production has to focus *initially* on two or one staple dimensions, in order to be coherent with corporate strategy, but *afterward* improvements must be pursued also in the others dimensions and this is for two reason:

- Preserve the position of advantage towards the competitors that might adopt or develop better process and surpass.
- In the 1980s, Japanese companies in the automotive industry proven that they products exceed the American ones in almost every dimension. Hence, there is an historical event to support the argument.

The key concept is that to attain excellence also in the other non-core dimensions, an organization has to decide the *order* in which pursue it.

It is intuitive that cannot be at the very beginning of its life a firm that excel in all the dimension, due to limits in management's competence, lack of relationship with supplier and customer, very poor organization culture to drive the behaviour of the personnel at all layers, also low "organizational learning".

What is being expressed here is something that recall Barney's VRIO framework: focus on developing competence that competitor cannot buy or copy easily.

Sometimes can happen also the opposite, that is rethink the strategy and firm's mission according to the resources available and approach the business in a different manner.

Hence, once has been set in place a coherent structure, that encompasses *Facility*, *Process* and *Technologies*, in accordance with organizational strategy, new rooms for improvements has to be find, that are the other dimensions of performance measure not yet addressed on one hand and, on the other, the development of skills.

When referring to "skills" there is a look to both the competence and craftsmanship/artistry of the workforce and to the overall coordination skills among actors within and out the company's walls.

How to and why develop the skills hence?

Regarding the *internal* set of skills at the single worker's level, the distribution of the products among the factories or the outsourcing of certain activity determine how broad/narrow are competences developed from factory to factory. Looking at the organizational level instead, the

infrastructure (organization structure/hierarchy) determine the development of certain mode of coordination among actors *inside* and *outside* the firm.

Skills also require time to develop, so along with the investment in equipment and/or plants, they require a mindful consideration for an economical return.

Its nature to be an *intangible asset* actually give more flexibility to the management that can plan training program over the years to shift workforce's competences according to the strategy to address the markets' changing scenario. In fact, personnel that daily engage in manual activities will easily learn new skills, and it will even be enriched by the fact that the competence previously nourished for years belong to a close field of application of the new ones.

On the other hand, since manufacturing is a capability that is conveyed by human sensitivity, it may be influence by cultural bias or dogma and therefore be find strong resistance to changes at the individual level, none the less at the organization level because those factors are deeply embedded and are carried out by tacit operating knowledge.

For these reasons, management should exert tight and constant pressure towards the manufacturing function, steering the effort of the labour force towards the organization goal also by communicating the vision and the project to achieve it.

When adopting this kind of perspective, the aim is to balance actions that take into account *short term* trade-offs that pertain *tangible* capability, those that can be purchased and exchanged in the market, but also consider those *intangible* assets that are developed at the individual and organizational level, unique and inimitable elements that manifest their value in the *long-term*.

1.4.2 Manufacturing and Localization Choices

Regarding *long-term* choices on tangible assets, seems worth to analyse the matter of "localization choices". Usually, investments for the productive department fall into the category of fixed assed, hence require years before enjoy returns. For this reason a carefully consideration must be made to be sure that the *market* will make worth the spending.

Market's characteristics in fact determine the strategy to address it and, as a result, the manufacturing location or outsourcing.

Let us first consider the case of a markets where *demand* is greater than the *offer*: in such a context the firm does not have to worry for selling the goods, the level of risk is also very low if not absent at all related to an investment to improve the plant.

The only concern is to *minimize costs*: in markets where all the supply is absorbed, investment are made to standardize the process, reduce waste, and rise the overall productivity giving to the workers newer and efficient tools.
A distinction must be made between those organizations that rely more on artisanship and those that are mass manufacturer.
The first ones privilege areas close to the supplier to locate a *single plant*: the lead-time, even with the technological tools, is comparable higher to the one of the mass manufacturer, also lower transportation cost are taken in account and in some cases the need to check and coo-develop the semi-finished goods.
The second ones instead care more about the selling because, even though it will be realized, the competitors can slow down its rate, slowing cash inflow, and even increase storage costs. In order to be close to the customer these companies will develop first *distribution channel* and after predispose *production units* (M. E. Garbelli (2002)).
Setting up a network of distribution and multiple business units find its balance in economies of *logistics, commercial activities* and *purchase*.
Such management of plant's location imply a situation of market *stability*, both cases set out above in fact need a relatively long time to properly exploit and benefit from the intangible and tangible asset deployed (network and equipment).

In a situation of over-supply market instead, that is where the *offer* is higher than the *demand*, the consumption trend also behave differently. More precisely, in an industry where variety and new product become best sellers due to reduction of geographic constraints (mobility of people and online shops with home delivery) and "coolness" driven by charismatic personalities that use social media, the offer need to follow the trend and be able to always catch the demand timely and accordingly.
The *dynamism* of the environment makes even more important the intangible features of the organization that need to get in touch with customers not only by leveraging on price but on other dimension. *Services* are a big deal when purchase is done if they facilitate users in their experience or are a manifestation of company's value and identity (M. E. Garbelli (2002)).
The staple concern of manufacturing department in this kind of environment is to standardize the process to attain cost reduction but still provide the assembly line with the proper amount of flexibility for assure capability in term of *variety*. To satisfy the need of variety, firm can also choose to outsource if particular task have to be performed.
The geographical constraint with the customer is not so tight as it was in the previous case so this actually allow new localization tactics: decisions are *market-driven* so placing the different

company's functions anywhere around the globe, where better condition are available according to the function features, might seems the best choice.
Spreading the different business unit do not preclude possibilities in the future to catch up with competitors and also allow to discover new supply networks.

Another author approach the matter of localization under another perspective: the manufacturing is usually a *low value-added* activity (due to standardization and/or process modularity) when considering the value chain as a whole in knowledge-intensive industries, so Ram Mudambi explore the different strategies deployed for managing the production phase in such case.

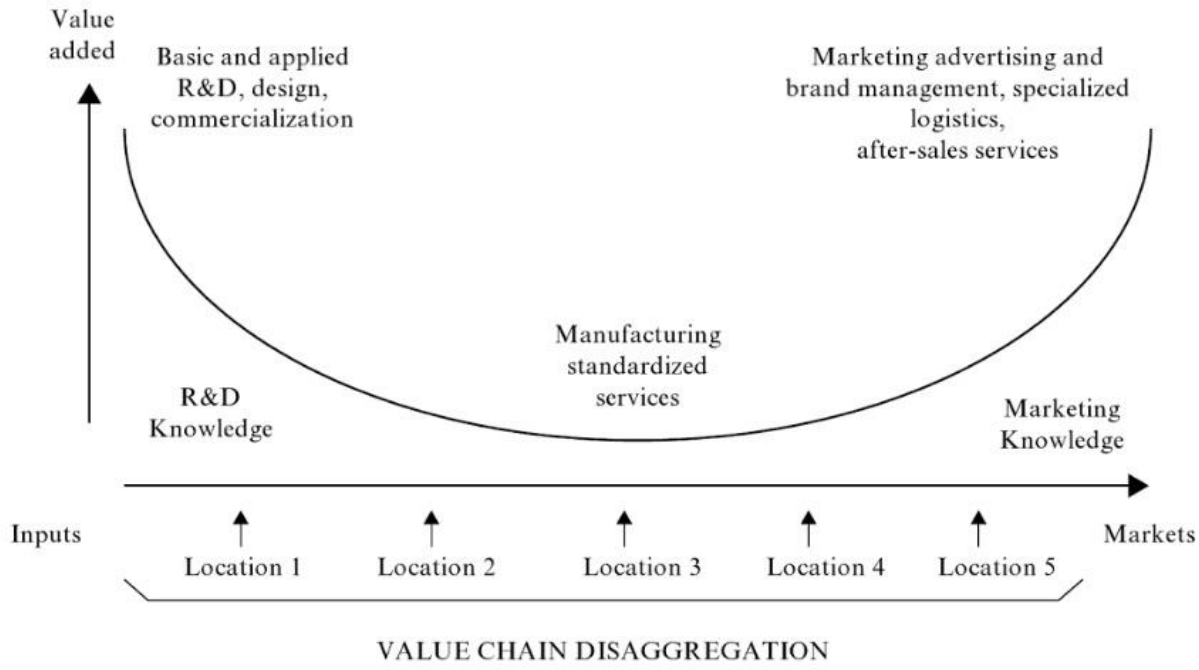


Figure 6

Representation of the "Smile model" by Ram Mudambi. Adopted from "Location, control and innovation in knowledge-intensive industries", Handbook of Industry Studies and Economic Geography, 2013. The figure shows the value added by the different phase from inputs to market, even assuming for the latter a specific location that may vary.

When referring to knowledge-intensive industries it means those sectors where the bigger share of final product's value is given by the *initial* or *ending* processes deployed to produce the good that are respectively R&D activity and/or marketing/brand management. Those industries might be the high-tech but also fashion, creative design can be as profitable as a patent for special chemical process.

If adopting this view is possible to depict a graph that resemble the form of a smile if considering the value added on the y-axis and the different production phases on the x-axis (*Figure 6*).

The contribute by Mudambi to the matter is that it he suggest to localize the activity, and hence internationalize if required, where it is economically convenient *ceteris paribus* but not necessarily to outsource the activity, in fact companies might decide to maintain *control* over the whole supply chain or specialize on certain activities, those where the value-added is higher. These two behaviour depend on the so-called *linkage economies* by Mudambi, which is the company's ability to let information flow readily between the production function and the other activities. This characteristic is not necessarily desirable, because organization may adopt different strategy for overcoming a lacks and face disruptive shift in the business.

One firm in fact may decide to exploit linkage economies exerting control all over the value chain, retaining the low value-add activity like manufacturing, for compete with *incremental innovation*. This kind of innovation consist in not changing the relationship between the core components of the good but develop and reinforce them to increase the performance (Henderson and Clark (1990)).

Other firm may instead specialize in high yield activity such as R&D and marketing (the extremities of the smile figure) and therefore overcome the limits or friction that information encounters when flowing between departments. These companies are strong competing through *architectural innovation*, which is change the nature of interactions between core components, while reinforcing the core design concepts.

A good example of these two competing strategy can be two company in the mobile-phone industry: Apple and Nokia. The first is a specialiser and the second adopt vertical integration. Which of the two is better? Do not be misled by the history of the two company. Nokia was experiencing tremendous success for a considerable long time, such company are more resilient in industrial context with low protection on intellectual property right (outsourcing production put the company in the situation of sharing with potential deceiving third parties very sensitive and precious knowledge acquire through R&D) (Mudambi (2013)).

What happened next was something that only few foreseen: a change in technology trajectory. Apple not only set the trend towards the "smart-phone" concept, but also being lighter under the fix asset capital, was able to shift to other supplier for production activity and capitalize on the intangible asset it has developed throughout the years: *strong brand identity* and visionary/futuristic *intangible knowledge* (R&D) for its devices.

Hence, the two strategies are winning according to the life cycle's stage the good is experiencing.

Concluding, manufacturing can be held internally but consideration must be made on the possible development of the industry, being smart enough to understand when it is time to lighten organization structure, dismissing production gradually for outsourcing and invest wisely in R&D.

1.4.3 Conclusions

The topics treated in the chapter should have treated exhaustively the matter of manufacturing in relation to the internationalization.
Starting from a strategic point, all the aspects and their practical implication have been draw, none the less the tools to measure and attain certain results.

In the next part of the dissertation, the relation with the Research and Development Department and the function of Product Development will be explored and several recall will be made towards the concept expressed since so far.
The two function mentioned play a significant role in project the company in an international landscape because provide that part of product and process innovation that cannot born through the manufacture.

2. R&D and Internationalization

2.1 Introduction

This part of the thesis will cover the topic of R&D activity and its management in relation to the corporate strategy, further investigating the ties with the manufacturing. The internationalization matter is taken under consideration when localizing the facilities for R&D, looking at the drivers that lead such choice. The structure of the chapter will be similar to the first: starting from a strategical evaluation and then moving to a operative management of the activity. The last part will deeply investigate the link whit manufacturing through the analysis of empirical cases and works from academics.

2.2 R&D Strategy

Before analysing choices regarding the localization of laboratories for activity of research and development, should be taken in consideration which are the strategic values and advantages that R&D activity bring to an organization and how and when to manage it.
It is widely acclaimed that R&D is a primary source for gain competitive advantages (Dweyer and Mellor (1993) cited in B. Sharma (2003)), many other academics also presented evidences on the strong correlation between the expense in R&D and the growth in revenues and profitability (Wolff (2000) cited in B. Sharma (2003)).
For these reasons, the strategic perspective will investigate not the profitability of doing or not R&D activity, but rather in which moment of company's life it is more important according to contextual factors and make/buy trade-off.

2.2.1 Contextual Factors as determinants of R&D choices

One contextual factors is the Industry of belongings, which, regarding to the kind, may present peculiar characteristic (fast and fierce competition, entry barrier, fast pace changing demand, etc.) and hence force incumbent to adopt specific pattern of R&D (Hambrick (1983) cited in B. Sharma (2003)).

Another important contextual factor is the stage a product is experiencing according to the Product Life Cycle (PLC) framework: organizational function gain and lose importance relatively to a product in relation to the phase of PLC (Fox (1973) cited in B. Sharma (2003)).

To give an example, it is plausible that during the phase of "diffusion" or "growth" after a product's introduction in the market, a lot of emphasis is given to the operative management of the company because it has to enlarge the capacity (demand is augmenting) and improve the coordination with supplier and distributors. In the "maturity" phase instead, more relevance have the function of marketing and R&D. In this case in fact, the boundaries of market's demand are known and the competition is played on the ground of market shares, customers can be gained leveraging on brand's reputation/awareness or relying on product's superior, but not necessarily, characteristics'.

These are just examples, in fact, further contextual factors to take into account are the size of the firm and the type of good produced, whether if it is sold in retail stores to the final customer or the company is involved in a Business-to-Business transaction (B. Sharma (2003).
Alongside these *external* factors, there is the *internal* plan of action that an organization set in place to compete in such an environment: the strategy (*Figure 7*).
Recalling the four generic strategies of Michael Porter, that are "Cost Leadership", "Differentiation", "Focus" and the so-called "Stuck in the middle" when a company adopt a half way approach, B. Sharma takes a step ahead in the discussion of the topic of R&D strategical effectiveness and efficiency, asserting that from these Business Strategies derive seven Functional Strategies (2000). This somehow comply with the discussion of aligning objectives of the different functions when talking about manufacturing in the first chapter.
Among those aforementioned, there is a formulation of R&D strategy:

"*R&D Strategy aim to improve operational performances through the use of sub- strategies such as competitive comparison, product development, new product development, substitute product analysis, product enhancement*"

- B. Sharma (2003) -

The findings of Sharma are based on a research done on Australian firms, aside from those results that strictly pertain the specific and restricted sample, some useful contributes can be used for make a more general assessment, that is whether the Contextual Factors (*external*) affect the R&D strategy.
First, it has been found that there is not a significant change on the emphasis put in place on R&D by the company according to their size. For "emphasis" is defined as the importance attributed by the management towards a specific function, so it is not a matter of amount

invested but it reflect the strategical importance of the function. That is particular important because it evidence the fact that the exploitation of a function may, especially the R&D, depend on a wider extent, not only by the resources but also by its management. Moreover, the limits of the size are explored further in the section of the Make/Buy decision, but even in that case there were developed instrument for overcoming the capital constraint.

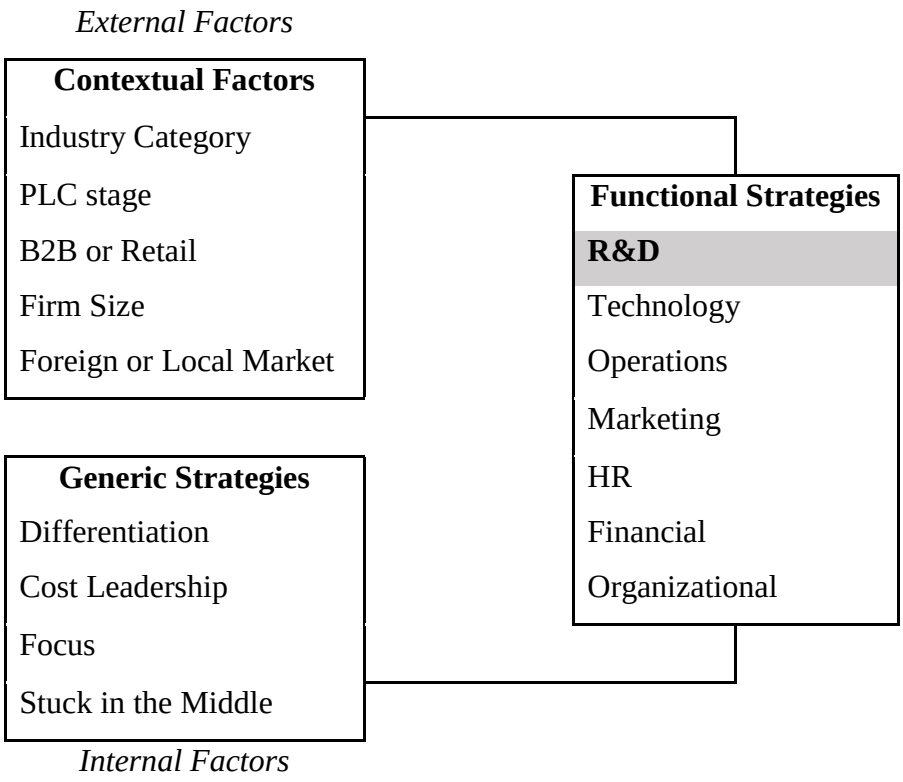


Figure 7

Internal and External factors that affect R&D strategy. Adopted from Sharma (2003).

Second, under the lens of PLC, the results shows that the companies rely more on R&D when their product are experiencing a growth, but also in the mature stage combined with the marketing function in order to differentiate from the competitors.

This last consideration permit to bring back the perspective at the Business level Strategy, in fact R&D support in different ways the four generic strategies: it may be deployed for minimizing cost through process innovation, it allows product development and hence differentiation.

One last contribute is that for firm that operate in a business to business context rank at a lower place the R&D, the author suggest that it may be due to a matter of less pressure by the customer, also by the fact that most of the time their offer is tailored on specific request.

Finally, the research by B. Sharma, corroborate and give additional evidences to the theories presented at the beginning of the section: gain a position of advantages and hence a growth in sales (in domestic and foreign markets) and even greater when compared to those firms that do not consider R&D among the top four functions to which give priority.

2.2.2 Make/Buy trade-off for R&D activity

Research and Development is very costly activity for a company, and even those which dispose considerable amount of financial resources, carefully evaluate how to invest. The matter is not trivial; time also has a major weight in the evaluation of an investment upon a project that may require even years before the results may produce something valuable. Sometimes may even happens that no knowledge is created, and that is a serious problem for a firm that has not only lost money but also deployed its expertise personnel in something unfruitful.
For this reasons, a framework for decide whether to buy or develop internally new knowledge is proposed in the discussion of R&D strategy, this will also have several implication with respect to the matter of internationalization.
For what regard the choice of outsourcing R&D activity the advantages are that the investment will always produce an outcome because it is more predictable since the kind of projects launched outside the company are relatively less complex to those manage internally and are related to non-core activity (Quinn (2000) cited in Cruz-Cázares et al (2013)). The overall cost is cheaper compare to the setup and management of a laboratory. Further, time is saved when apply to an organization that master researching in a specific field. Outsourcing is also an expedient to overcome a capacity constraint in particular moment of a company's life (C. Cruz-Cázares, C. Bayona-Sáez and T. García-Marco (2013)).

On the other hand, a company should not only relay on external expertise for develop competence: all the knowledge acquired will give only a temporary advantage because even competitor can acquire it since it is sell on the market (Kessler and Bierly (2002) cited in Cruz-Cázares et al (2013)). In addition, the company tend to underestimate the cost of managing a research project outside: initially, the screening the market for identify proper knowledge bases, then the bargaining on the variable cost of the performance, the monitoring, follow ups are all costs that are not taken into consideration since when they occur (Cruz-Cázares et al (2013)).
Buying knowledge can be very helpful for a young company that is developing and need to be quick in following the market's need, but eventually it should develop its own R&D function.

Over-dependency on suppliers is to be avoided, unless the firm is a key customer or a business partner with respect to the supplier (Bertrand (2009) cited in Cruz-Cázares et al (2013)).
One further drawback is that not mastering the research activity may also affect the capacity of fully absorb the knowledge and, consequently, not totally exploit it.
That is why Cruz-Cázares et al (2013) explore the opportunity to both combine buy and make choices in order to have multiple benefits.
The absorptive capacity approach (Zahra and George (2002) cited in Cruz-Cázares et al (2013)) support this view since findings shows that organization that do research and development activity internally can better acquire external knowledge and further can better transform/exploit it. Performances do not improve without an adequate absorptive capacity (Bapuji et al. (2011) cited in Cruz-Cázares et al (2013)). Other authors, like Chesbrough (2003), has observed that firms actively search outside for new technologies and new ideas, concepts to incorporate and innovate their products.

Google is a good example of such a practice, it acquire start-ups that does not have an immediately use among their project, but they foresee the potential and eventually they exploit algorithms in a near field of application.
Ultimately, external and internal factors are taken in consideration even in make buy trade-off (*Figure 8*).

External Factors	*Internal Factors*
Technological Intensity	Technological Resources
Industry Competitiveness	Commercial Resources
Innovation Appropriability	Organizational Resources

Figure 8

Main Internal and External factors that determine make-buy trade-off. Adopted from Cruz-Cázares (2013).

For what concern the *Internal* factors, some of them were previously explained. For example, the *organizational resources* comprise the human capital (Kelley et al (2011) cited in Cruz-Cázares et al (2013)) and the capacity of absorption. They are directly correlated to a make decision: the higher is the level of expertise within the firm and hence the absorption capacity (developed through the years of R&D practicing), higher is the probability that the firm will embark in an internal project.

Technological resources encompasses all the technological equipment at disposition, also through vertical integration, and related capability. When high, it indicate at first that for the company R&D is a relevant activity, and on a second stage, the grater it is (compared with the competitors), the lower is the probability of externalizing, because company already has the "hard stuff" to do the R&D activity (Williamson (1985) cited in Cruz-Cázares et al (2013)) . It also affect positively the capacity of absorption (Zahra and George (2002) cited in Cruz-Cázares et al (2013)).

Commercial resources influence positively the make-buy style because it rapresent the reputation and relationship it has with foreign clients, the rationale is that organization with high reputations abroad gained trust by introducing their self into the foreign market thanks to the accessing of foreign knowledge and technology (Tomiura (2007) cited in Cruz-Cázares et al (2013)).

Looking at the *External* factors, *industry competitiveness* push companies to adopt even in this case the make-buy style, the reasons are the need to save time and face the rapid change in the market while and in-hose R&D provide core differentiation and barriers of entry.

Innovation appropriability regard the legal level of protection of Intellectual Property Right. In markets where there are strong authority of vigilance and the possibility to bring the disputes in court, revenues stream are preserved and hence decrease the riskiness of make strategy, allowing to appreciate the its features of high control over it and the greater advantage that it bring to the organization.

Finally, *technological intensity* refers to the circumstances whether the firm is in a high-tech market or not. In high-tech market firms has to be always close to the last tech newness with regard to the features of their offer, this is attained by the make-buy style that allow flexibility and at the same time preserve the capacity of absorption.

In conclusion, the empirical study by Cruz-Cázares et al. support the thesis that nor buy or make strategy is better than the other, but rather a combination of the two overcome the weaknesses of the other and allows grater economic performance, thanks to the ability to catch up with competitors and attain grater competitive advantages.

2.3 Localization and Structure of R&D

In this section will be discussed the topic of localization. Companies may settle or move their research and development laboratories around the globe, but which are the reasons behind such

choices? Two different approach are presented, one that focus on the technological matter and the other that put emphasis on organizational structure and related evolutionary scenarios.

2.3.1 Home country vs. Host country localization

The first reason that comes to our mind when thinking about why a firm may decide to locate a laboratory of its own abroad, is that that firm was looking for something that was not available in its home country. The analysis is quite trivial but a wider spectrum of possibility is formulated if comparing the technological activity in the home country vs. the host country.

When referring to "technological activity" it is intended to indicate the technological achievement within a limited area (country level), it can be expressed as the technological progress (available technology) and know-how related, both tacit and explicit. Le Bas and Sierra in a research study published in 2002, attempt to make a comparison in two different periods between companies' behaviours by considering the patents registered as an indicator of "technological activity". Although it does not capture the effect and the attractiveness of tacit knowledge, the work of Le Bas and Sierra is valuable since it gather a subset of data that include firms from almost every country around the word.

The aim of the research was to picture the landscape of researching activity and verify if companies actually go abroad in search of knowledge, the choice of using the patents as basic data gives a further advantage since it provide information about the location of the inventor(s). To discriminate whether the knowledge seeking was present or not, was necessary to make a comparison between the levels of technology of the host and the home country. Based on the dataset, two indicator were developed using the index of *Revelaed Technological Advantage* (RTA), an instrument invented by Soete in 1987 and used in numerous other research study.

Hence, four scenarios are traced (*Figure 9*), assuming high and low technological activity in host and home states.

The *Technology Seeking* strategy is of course present: when the technological activity, measured through the RTA indicator, is *high* in the host country and *low* in the home country, it is plausible to assume that company move an activity to a specific area where specific human capital and technology is available.

The *Home-base-augmenting FDI in R&D* is comdidered present when company invest directly in foreign country (FDI) and the levels of technological activity are both *high* in host and home regions. The rationale of this behaviour is that being present in another part of the market where same technology is adopted, allows to monitoring competitors' development and at the same time exploit "knowledge spill over", that is the mutual exchange of tacit knowledge. It also

improve the learning capability of the investing entity, further reinforcing the absorptive capacity.

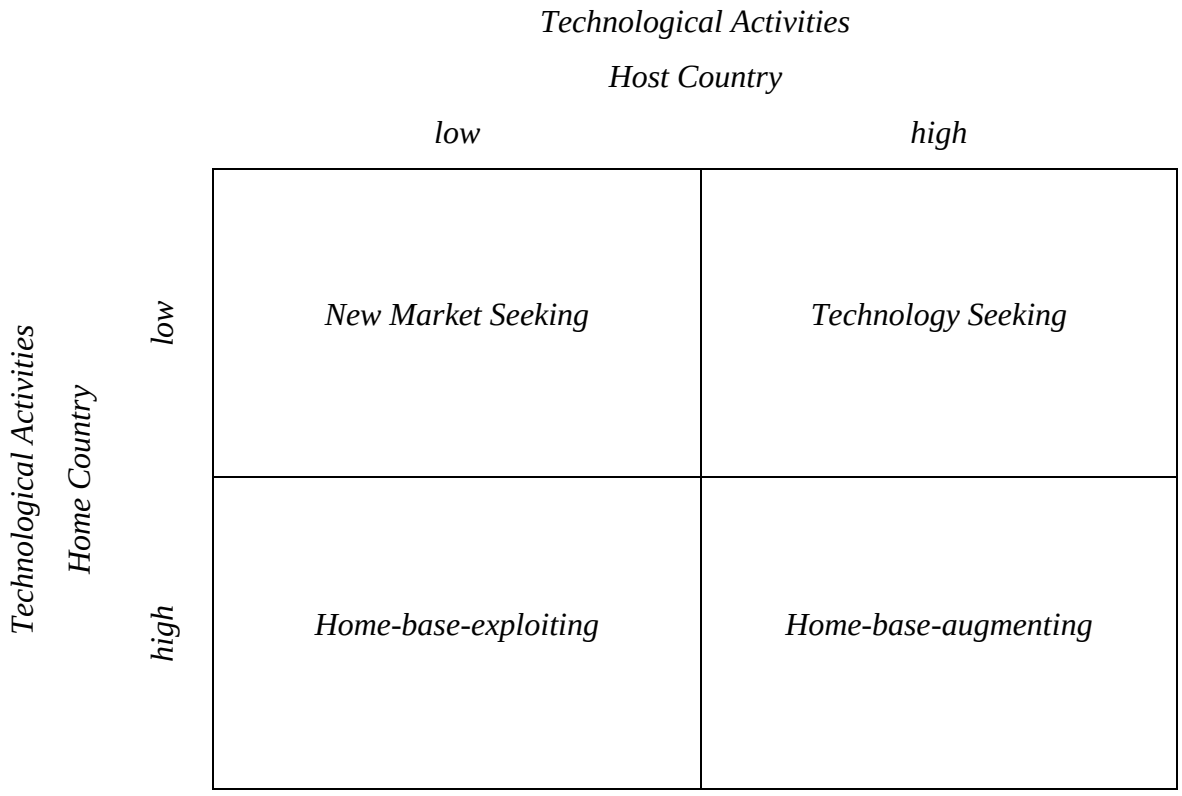


Figure 9

Different localization strategy identified according to technological activities of home country vs. host country. Adopted from Le Bas (2002).

When the level of technological activity is instead *low* in both in host and home country, the meaning of invest for R&D activity seems useless. In fact, Le Bas and Sierra has attribute this strategical action to the need of *seek new market* as a way to grow internally. The situation yet described can be in fact the result of an acquisition, hence a temporary situation, this is also why the researchers take the data from two different period to see if changes occurred.

The last scenario is when a company is *high* is its home country in terms of technological activity and invest in a country where the technological activity is *low*. It is the defined as the *Home-base-exploiting* strategy and it consist in exploit the knowledge in country where it is not present by supporting local firms or even own subsidiaries.

The two "home-base-exploiting" strategies are those that has been encountered with high frequency in case, further are those strategies that actually represent an evolutionary path for firms that start from a *low* technological activities country.

2.3.2 R&D Structure and Evolutionary Paths

Continuing on the evolution over time of the R&D function, another study is take into consideration to reflect on the structural organization of R&D. The work of Maximilian von Zedtwitz and Oliver Gassmann (2002) bring a huge contribute to the research done in this field because it look at the localization of R&D by making an interesting initial distinction: von Zedtwitz et al. in fact approach the matter separating Research activity from the Development activity. This has some several implication, and actually permit to evaluate and understand the R&D activity of a firm in relation of its strategy.

To give an example, two firm competing in the same market may reinforce their competitive advantages through "R&D" but differently: one focusing on the development of the current products' characteristics, the other one instead, focusing on research, being the one that bring innovation into the market.

Hence, when separating the "R" from the "D" and looking at the structure of a company, can be traced different localization choices for units of Research and units of Development.

The work of von Zedtwitz et al. is supported by the empirical analysis of four multinational company that are also taken as an example to describe the four way of managing Research activity and Development activity. The *access to market* and the *access to science* are the two main rationale that force to internationalize the R&D functions.

The study stress on the localization as well because localizing one or more unit abroad, according also to whether if it is a Research or Development unit, is an index of the purpose to which the company is aiming and hence leads to internationalization pros and cons.

The framework to identify the four organizational structure constitute of two dimension: research and development, in both case discriminating if they are carried out domestically (in the same region of the headquarter) or globally (all across the word), the following schema will help picturing the four situations (*Figure 10*).

The situation where a company has both research and development in the local country is defined as "*National Treasure R&D*". The company that was taken as an example for this situation was focusing on the local market and decided to concentrate the different research projects in a unique "technology headquarter" so that for maintain coherence among them. This firs short description of the case recur issue previously addressed: the need of monitoring the project require constant check and exchange of information, so having a unique laboratory allows communication among the research unit and whit the headquarter, making easier for the Chief Technological Officer to exert control and monitoring. Localizing also development in the home country is a choice that derive from *market* need: 83% of firm's total sale are realized

domestically, foreign customer are less important and in order to stay closer to the local ones, development is carried out domestically. Hence, organization that centralize R&D are those that focus on the local market or are in a strong dominant design position in their main technologies, that mean no need to move abroad for attain *knowledge* is necessary.
Grouping research unit locally and having several development unit dispersed is an organizational structure defined as "*Market Driven R&D*".

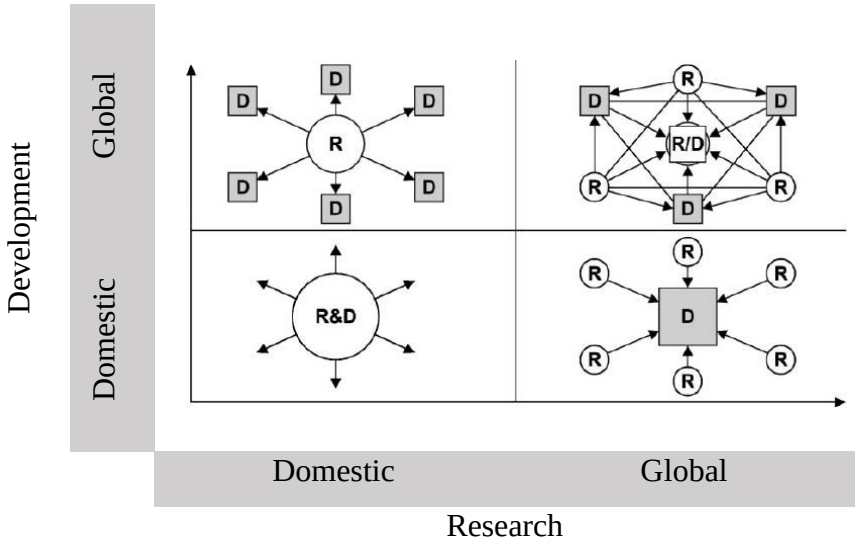


Figure 10

Image adopted from "Market versus technology drive in R&D internationalization: four different patterns of managing research and development" of Maximilian von Zedtwitz and Oliver Gassmann (2002). The image represent the different way of organizing the different units of research and development domestically or globally.

This configuration, as the name suggest, allows the company to satisfy the different needs of the market it is supplying. The situation encountered in the study was a firm that decided to place development laboratories close to the production facilities and even engineer in the site of the installation in order to satisfy at the best customers' request and at the same time allowing a direct feedback from the market that could give new ideas for research activity.
"*Technology Driven R&D*" is a configuration that consist in having a local development activity but dispersed research activity. The rationale is the same as the one encountered in the other case, that is acquire knowledge abroad and develop solution for the local markets. The company that adopt this configuration hence are those that lack in knowledge and focus in serving domestic market.
The most complex configuration is the one that consist in having both research and development dispersed, the so-called "*Global R&D*". Firm that adopt this configuration are those that need

to satisfy local markets' need and the constraints of high-technological products' and/or processes' content occur. An example could be a pharmaceutical company that do research in different sites, since different medicines require different expertise and know -how, and different development facilities are settle to respond to law compliance.

The last configuration presented can be seen as an evolution of the "*Market Driven R&D*", because it serve the purpose of compliance whit the market in term of characteristic and legal requirement but the knowledge is no more carried out in a restricted region but globally.

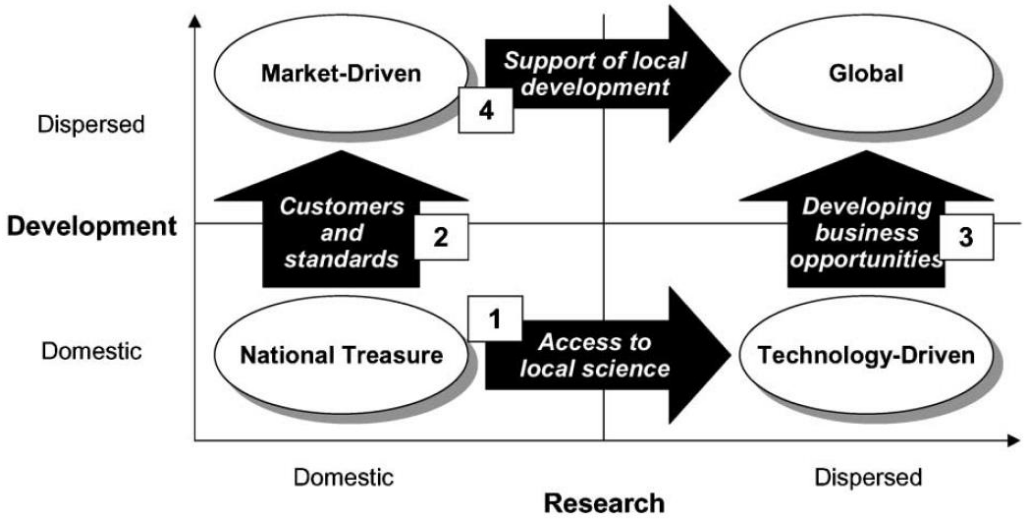


Figure 11

Image adopted from "Market versus technology drive in R&D internationalization: four different patterns of managing research and development" of Maximilian von Zedtwitz and Oliver Gassmann (2002). The image represent the different evolutionary path for the R&D configuration.

Is from this last observation that four *evolutionary path* (*Figure 11*) are then identified and can help the practitioners to elaborate on the configuration shift that may take in the future to respond to the two force aforementioned: *market* and *science* (knowledge).

The evolution paths indicated with number 1 and 2 are quite intuitive to predict: firms that adopt the "*National Treasure R&D*" model will eventually shift from a more customer-oriented or technology-seeking configuration by moving R&D units abroad. It was also argued in the article of von Zedtwitz et al. that the "*National Treasure R&D*" is a configuration of those multinational company that are relatively young and that if in the future might want to develop their international sale's volume will inevitably settle "R" or "D" unit abroad.

Evolution path indicated with number 4 respond to the case previously discussed: the need to support local development with Research activity due to high-technological content of product or process.

The last evolutionary path to discuss is indicated with number 3, it is realized when development laboratories are settled near the customer to support tailored solution starting from a position of dispersed research activity. Recovering the thoughts done when discussing the case of the "*Market Driven R&D*" configuration, a "*Technology Driven R&D*" model may benefit as well staying closer to its customers by developing new business opportunities thanks to the wider amount of internally developed knowledge underexploited.

The discussion on "R&D" localization allow to appreciate the link between that activity and manufacturing when finding the rationale of establishing a development unit abroad, close to the factory, that is support the production activity.

The last part of the chapter will investigate deeper such matter through a strategic and operational perspective.

2.4 Ties between R&D and Manufacturing

Many companies underestimate the importance of involving production and other function during the R&D phase. The related problematics emerge when the knowledge or the new process is translate in an operative plan, an example could be an unexpected high cost of production due to esthetical features of the product, symptom of a completely ignorance of the process' costs and constraints. Another further problem can be the impossibility of finding a supplier that can provide a particular component timely and economically due to geographical reason, or even that cannot be flexible to small changes, in this case symptoms of missing to involve the purchase department (Daniel Olausson, Thomas Magnusson and Nicolette Lakemond (2009)). This kind of issues relate to discussion made in the first chapter when relating the manufacturing function with the other, also stressing on the need to coordinate the effort of the functions towards the same corporate objective but respecting their relative target of performance. The case study from Olausson et al. reprise the discussion in this sense and through the analysis of four empirical cases it defines a framework in order to individuate the major challenges an organization has to cope with regarding the level of vertical integration and the characteristic of the R&D task.

2.4.1 Coordination between Manufacturing and R&D

The mediator between manufacturing and R&D is the purchasing department in the view of Olausson et al. because it allows to overcome several coordination problem. In the literature however many authors focused on a coordination tool that is the so-called "Design for Manufacturing" that is, in its broadest sense:

"*Any step, method or system that provides a product design that eases the task of manufacturing and lowers manufacturing costs.*"

- Bralla (1999) cited in Olausson et al. (2009) -

In adopting such a view, rules can be established to guide the daily work of the development department, but on the other hands this can not be only instrument to coordinate R&D with manufacturing because it don't consider at all the operative aspects that will take place afterward the ideation of new product or process.

The activities of the purchasing function can hence be distinguish in *Strategic* and *Operative* (Van Echtelt et al. (2007) cited in Olausson et al. (2009)) : the *strategic* ones guarantee a proper preliminar selection of suppliers with which to join a new product launch, considering elements as quality, lead-time, flexibility in the range of raw material/semi-finished good or service provided. Further, the involvement of the purchasing department during the R&D phase may allow individuating among the suppliers a partner in the development activity: even suppliers in fact make "R&D" activity to preserve the integrity or increase their value proposition.

The *operative* activities instead support the production stage, so that manufacturing function can effectively achieve its goals, allowing also to consider whether to outsource process's phase.

Challenges of the Purchasing department are several and they depend on the *characteristic of the development task* and the *degree of vertical integration* (*Figure 12*).

In a situation of full outsourcing and low to medium product/processes newness, there are companies that has custom request but standardized in the sense that there are certain given parameters for customize. The manufacturing moreover is not critical since suppliers are perfectly able satisfy the request timely and costly, disposing of economies of scale and scope (an example could be the semiconductor Industry (Pisano and Shih (2012)). In such situation, start a new project may reserve undesirable drawback if the supplier are different from the previously contacted. The case described in the paper highlight the importance of receiving

feedback from supplier that has to produce specially designed component, giving particular attention to process' costs that could be lowered consistently with small adjustments.

Development task product/process	high newness	C: access manufacturing competence P: understand suppliers' processes	C: exploit manufacturing competence P: establish close working relation
	low-medium newness	C: receive feedback from suppliers P: establish understanding for suppliers coordination, motive suppliers	C: early involvement of manufacturing and suppliers P: reduce variability in supplier performance
C: coordination challenges P: purchasing challenge		Outsourcing	Internationalization
		Degree of Vertical Integration (*production*)	

Figure 12

Image adopted from "Preserving the link between R&D and manufacturing: Exploring challenges related to vertical integration and product/process newness" of Maximilian von Zedtwitz and Oliver Gassmann (2002). The image represent the challenges to address depending on the degree of internationalization and the characteristic of the development task.

Of course, the supplier is not incentive in giving suggestion unless motivated, an incentive could be an agreement for further collaboration or expansion of its network for business opportunity. A way to coordinate during the development of the new components is as well important to reduce at the minimum the cost of production.

Remaining in the range of low/medium product/process newness but considering the case of a fully integrated multinational, the key issues to address are to assuring continuity in the level of performance of the supplier throughout the planned period of production and involve it in the early stages so that to comply with the production process. In the case presented in fact, in order to respond to flexibility in product range, supplier needed to be involved earlier in order to match time and component requirement.

In the case of high level of newness of product/process and outsourcing is of paramount importance to access the competence of the counterpart, since succeeding or not in the new project is a binary outcome. For firms that outsource is impossible to develop and retain the

technical skill of the new product/process hence the purchasing function in this circumstance may give its major contribute by understand the supplier process, also for future projects.

Finally, when internationalization is matched with high newness, the major challenges are related to the high emphasis given to R&D with respect to the production function and purchase. When internally disposing of production activity the risk is to overlook the actual capability and hence do not exploit it properly. The purchase department instead need to follow up whit the R&D development so that to be ready and aware of the supplier that will be activated for the new production.

Attributing this somehow new role and responsibility to the purchase function within an organization reflects the assumption and consideration made in the first chapter when discussing the central role of the manufacturing: the other activities support the production not only directly but also mediating between that and the others.

The R&D does not have to work on its projects with capability's constraints that relate to the operational phase (production), because a company is an evolving entity, but on the other hand, it has to be aware of the characteristic of the organizational structure, capability, management competence and experience, know-how etc.

This means that, whether a company will outsource or will internally carry the production, the purchasing function will play an important role in maximizing the economical return of R&D output and demanding the good outcome of a project in which a company has embraced to coordinating procedures as "design for manufacturing" ignore the complexity of firm's mechanisms.

2.4.2 How Operation Management influence R&D and vice versa

Deepening the discussion around the topic of R&D and Operation management, the study by Caniato et al. (2015) analyse the link between choices regarding the outsourcing of operation and the outsourcing of development activity. The industry under analysis is the fashion sector, sampling six brand owning companies (see chapter one for a full detailed explanation of the case study), the authors where able to find commonalities among different firms in the way they

manage similar product according to the *level of importance* in their respective collections and to the *supply-chain's geographical distribution*.

Before going further, seems useful to make some specification regarding the phases of product development, adopting the subdivision in three stages (Kincade, Regan, and Gibson (2007) cited in Caniato et al. (2015)):

1. *Concept design and line Conceptualisation*

   The first moment in which the creative director establish the core theme/s of the collection, not even caring too much about the apparel but rather finding inspiration from source that cross the border of the "*fashion world*".
2. *Product design*

   That part consist in the creation of the pieces that will form the collection, stylists draw sketch and review periodically the development of the collection with the creative director, also presenting prototypes.
3. *Industrialisation*

   This part comes afterward the approval from the creative director, even though during the development there is a little work also in terms of industrialization because even price, and hence margin, is taken into consideration when defining the role of a single piece within the collection. In this stage a technician, an expert that knows the artistry and the processes, define a precise list of steps to follow when producing the good, in order to make it in the economic, standardized and fastest way.

Company might decide to outsource the entire process or part of it. The study by Caniato et al. has found that all the companies involved performed the first phase: this is actually not surprising because even an external developer must have an input regarding the range of products that will be created.

On the other hand, the *product design*, in the case of a very large product portfolio, might be one of the phases to be outsourced because the brand owning company might decide to focus on its core/best seller articles rather than those that actually are just small part of the collection (managing complexity). This mode of development is used also by SMEs with the major aim to overcome a limited budget and/or internal limited resources for developing a collection.

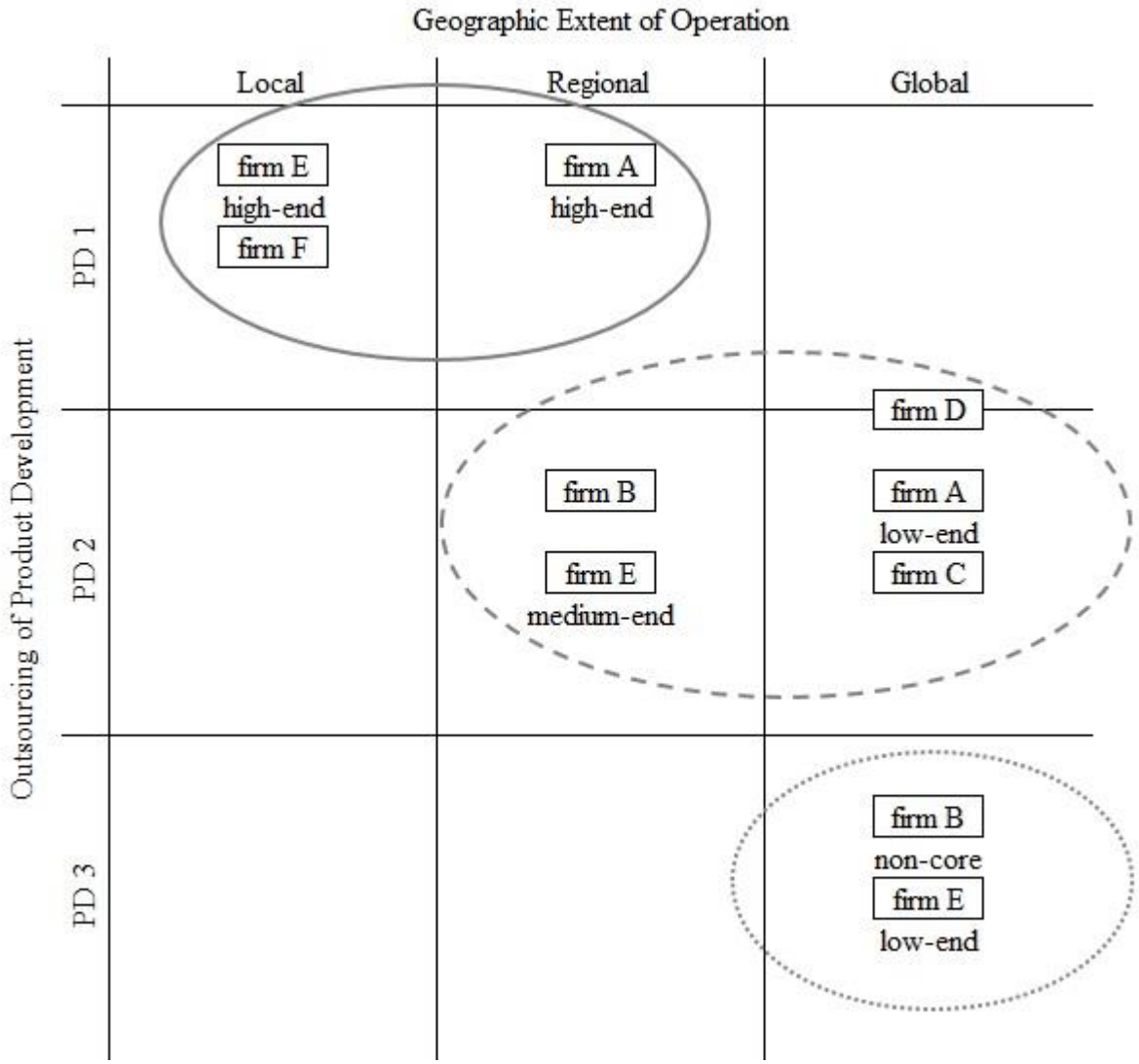


Figure 13

Visual representation of product development outsourcing choices in relation to the geographical extent of operation and positioning of the products. The rectangles in the figure are the products group labelled with the firms that "own" it, under is also specified the positioning of that group of products. PD 1 mode is when a firm carry out all the three phases of the Product Development, PD 2 when it externalize the Industrialization phase and PD 3 I when just the Concept design is carried out internally. (Adopted from Caniato et al. (2013))

Industrialization as well might be manage *internally* or *externally*: those organization that dispose of production facilities involve, during the development phase, the own industrialization department so that at the end the company will be sure to be able to produce the good given its equipment and labour's knowledge.

Those company instead that do not has internally the capabilities and/or the manufacturing capacity, might find convenient to delegate the industrialization part to the supplier that will afterward produce the good.

Managing the relationship with the supplier may gain certain style according to the degree of outsourcing: the study shows that the more the product is highly positioned, the more the relationship, in terms of control and joint development of the collection, become tight, also showing grater level of vertical integration.
Looking also from a geographical perspective, the more the relationship is tight, the more the company and its supply chain are concentrated in a narrow region.
Figure 13 depict the situation described: the three circles represent the types of relationship in which a company might involve to manage the supply chain, it's easy to appreciate that over a certain geographic scope the PD 1 mode, that is carrying out internally all three development phase, is not used on a global scale. The distance between R&D and production is critical to that subset of products, but the same can not be said for that products that are developed through PD 2 mode, which is outsourcing the industrialization phase (last phase). For this category of products, the manufacturing part appear to be relatively independent from the R&D activity, maybe because of the implicit characteristic of the product or maybe because of the positioning of the product that is from medium to low-end, and so requiring less concern for quality.
This study is related to a specific sector, the fashion industry, but it demonstrate some broad concept that could be valid even for other industries. The necessity of having an intense relationship with the supplier force the company to manage the level of activities' outsourcing and product's development outsourcing, this two dimension determine afterword the kind of relationship and the geographical wideness of the supply-chain.

2.4.3 Innovation and Manufacturing

R&D activity is widely seen as the major source for innovation whit regard to product's characteristics, affecting the production process, allowing inimitable manufacturing, or through the development of new components, giving unique identity to the finished good.
It is on such a perspective that the work of Pisano and Shih (2012) look at the innovation matter proposing a framework to determine how strategically is relevant to own the production activity and the necessity to have the R&D near to the production facilities.
The authors identify two drivers that determine the strategical choices on manufacturing when looking for preserving internally the innovation capability.
One has been already presented when discussing the coordination matter, which is establishing a set of rules to comply when designing a new product so that the production can be performed economically and attain a standard output. Not always is possible to do that, it depend on the

characteristic of the product or the production process itself, Pisano and Shih define this extent as *modularity*.

"*The degree to which information about product design can be separated from the manufacturing process*"

- Pisano and Shih 2012 -

To give an example: designing the circuit of a microchip does not require knowing the production process, several supplier can in fact realize the item almost identically, because the methods for producing are standardized. On the contrary, a firm in that greatly rely on the artistry of the labours, even when making available a full detailed bill of material, may attain two different products if recurring to two different supplier, that is why these company usually vertically integrate or establish tight relation with suppliers.

Assessing the degree of modularity is not trivial, but few question may help in that. First of all design process's level of codification is useful to consider when evaluating modularity: clearly a 3D model of car's body give extensive and mathematically precise proportion in the curve of sheet metal, it can be even exported in multiple formats and usually it can be translated in a program to be executed by a machine. Such link between the Computer Aided Design (CAD) process and the subsequent Computer Aided Manufacturing (CAM) is associate with flexibility in manufacturing but not necessarily with modularity (Fine and Hax (1985)), in fact design might not be totally separate from the manufacturing process because the machinery that is deployed to curve the metal has certain limitation.

Surely, on the other hand, translating clearly how cut and sew different fabrics might be not as easy and when looking at high-end clothes, where tailor's tacit knowledge cannot be described. Other aspects to investigate are how much the product will change with small changing in the production process and how much the design process itself can be described without referencing the manufacturing process.

The other driver taken into consideration is the *maturity* of the production process, which is how much the production process has evolved since so far and if there are any sign that there will be any further improvement. The reasons are multiple: in sectors were technologies available for production change with rapid pace, a company may lose it's role in the market because the competitor will be able to produce better product at the same price (innovation linked to product) or similar product at comparable lower price (innovation linked to production cost). The level of maturity can be assessed looking at price's movement in the market, if they are continuously going down it's because equipment vendors and competitor are investing

heavily in R&D (Pisano and Shih (2012)), also looking beyond the border of the industry to oversee possible disruptive changes in the one in which a firm is already competing.
According to the different degree of *maturity* and *modularity*, an organization might fall in one of the four circumstances illustrated below

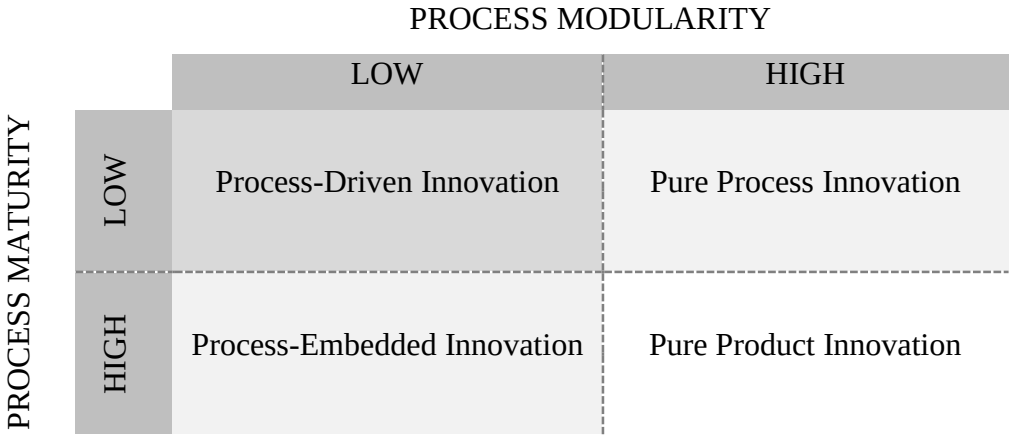


Figure 14

Maturity and Modularity of production process as determinant of different kind of Innovation. Adopted from Pisano and Shih (2012).

In the case where there is *high* level of *maturity* and *low* level of *modularity*, the need to keep R&D (design activity) close to the production facilities is high, that is because small changes in the production process, even if performed with the best equipment at the state of technology, might affect the outcome. Great example of products that fall into this category are the aforementioned high-end apparel, crafted products and special chemical. The innovation hence is *embedded* in the process itself.
When both *maturity* and *modularity* are *low*, is usually the situation of new emerging market where the production process is still in developing and a standardization of the product has not taken place. In this circumstance, the innovation is *driven* by the *development* of the *process* itself, an example of that is the biotech industry, hence having separated the R&D from the manufacturing facility may lead to catastrophic consequence.
Remaining whit *low maturity* but assuming *high* level of *modularity*, the only actual interest of the organization is to minimize cost, hence outsourcing might be a valid option also to gain flexibility in circumstances where keeping design close to manufacturing is not mandatory. However do not overlook the trajectory that the industry might take and lose the opportunity to develop own knowledge on production, precluding also the possibility to relocate the positioning.

The last case is the one in which there is both *high modularity* and *maturity*. In this situation the innovation pertain purely the product itself: standardized and flexible process are adopted to create the finish good in such a sophisticate way that there is no need to involve in the production process and the level of customization allow attaining unique items. An example is the advance semiconductor industry where a company that has both production and designing does not exist, there are just big colossus deeply specialized in one if the two activities.

Clearly, the economic risk of separating manufacturing from R&D decrease when maturity and/or modularity move to a high degree.

There are not advantages or disadvantages in being in one or the four areas in *Figure 14*, rather it is important to understand the position of a company to address properly the dynamics that play in such circumstances, leveraging on them, using them as barriers to protect the competitive advantage.

For example, why should a high-end fashion brand strive for *high modularity*? The *low modularity* is actually what give and preserve value to the company.

3. Presenting the case study, Crocs Inc.

In this chapter there will be a presentation of the case study, giving an overview of the company at global level, presenting its history, products, markets and financial results. In a second moment, moving to a narrow scale, the topics of manufacturing and product development will be explored through reporting the direct experience of the writer in the company's branch located in Padova (Italy), EXO s.r.l.
The Italian factory has an important role within the organization: the activity of product development is carried out with a staff of more than nine people and account for models that are produced all around the world, not strictly in the branch.

The production activity, further, provide shoes for clients on global scale, arriving to produce over than three million pair in year 2015, thanks also to the partnership with Diamant s.r.l., an Italian company to which Crocs outsource great part of the European production.

Finally, a laboratory that monitor the chemical markets and develop new compound, the main production factor, secure global quality compliance in the production and support the product development activity.
Crocs has a unique way for realizing its range of products as well the latter are recognizable on the shelfs of a store.

3.1 Company profile

Figure 15

Logo of Crocs Inc.

Crocs, Inc. (Figure 15) is a multinational company that design, produce and sell casual footwear for men, women and children. All products features Croslite™ material, a proprietary technology that gives each pair of shoes the soft, comfortable, lightweight, non-marking and odor-resistant qualities.

3.1.1 Company History

Crocs Inc., founded in 1999, was set in Colorado but with a different name, Western Brands. The firm's founders were Lyndon Hanson, Scott Seamans and George Boedecker.

The three friends decided to produce these soft and flexible shoes while they were on a sailing trip in 2002: they accidentally came across a new boating clog produced by a Canadian company, Foam Creations, Inc. They liked the product very much because of its characteristic: it was lighter and softer than the other shoes that were commonly used by sailors, they shape according to the person's foot and, due to the material, it was less likely to slip on a wet boat deck. Further, the holes on the clog assured good ventilation and minimum odor's absorption.

During the vacation, the friends discussed possible improvements for the product and eventually decided to market the ideal boating shoes.

They hence acquired the right on Foams Creations' manufacturing process and start producing the shoes once returned to Boulder. Within November of the same year, the clog made its first debut at the Ft. Lauderdale International Boat Show with its first model, the so-called "beach". The enthusiastic attendees purchased all the pairs that were available, 1.000 pieces.

For this occasion, they changed the name in Crocs, an abbreviation of crocodile (also the animal in the logo) because they wanted to associate the ideal attributes of the animal to their product: comfortable both on the land and in the water, strong, and long-living.

The success of the colourful clogs was strengthened afterward by retail accounts, almost 300 in the firs year, that saw the potential of the product, and sold many pair to people who spend long hours on their feet, such as hospital employees or restaurant workers. People with swollen feet enjoyed the comfort, middle school kids start using them due to the brightness of colours and gardeners like the fact that they could easily clean them by spraying some water.

In the first year on the market Crocs realized 1.2 million in sales with 76.000 pair and just one year later, 2003, revenues overcome 12 million through the selling of almost 650.000 pairs.

Crocs was experiencing such a growth and success that in 2004 the management of Western Brands decided to acquire Foam Creation, picking up the right on Croslite™, the special material of which are made the shoes.

This rising star company needed also to strength its management in order to properly handle the growing demand and strategically manage the operation on global scale, for such reason in 2005 the founder George Boedecker, at that time CEO of the firm, stepped down in favour of Ron Snyder.

This manager came from Flextronics International, a company that design and manufacture component for electronic device. Snyder previously proved to be able to expand distribution on a global scale and consulted Crocs for six month before being appointed as CEO.

Even if coming from a completely different industry, the manager was successful in pursuing the expansion programme due to the fact that the operation for the specific products of crocs has lot of commonalities with the operation in the electronic industry.

For example, there is high modularity between design and production, further the assembly process is relatively simple compare to the average shoes product.

Crocs became a public company in 2006, right in the middle of its expansion and in the same year received patents to cover manufacturing process and features related to the styling of several models.

3.1.2 Products and Markets

Crocs' products are widely recognized for their unique characteristics: colourful, comfortable, easy to wear and with a unique shape. These clogs appeal broadly to different segment of consumers, from kids to adults, from workers to hobbyist.

Such a diffusion appear inexplicable to many, since more that someone joked about the objective ugliness of the footwear, so Jonathan Schoenberg, a marketing consultant, played on this first impression that people have when they first see the shoes and give birth to the "Ugly Can Be Beautiful" advertising campaign (Figure 16). The goal was to promote the shoes' comfort, unique styling and economic price in a likeable way, exploiting the first reaction of curiosity.

The ads appeared in magazines as Vanity Fair, Rolling Stone, Time, GQ, Men's Journal, Real Simple and Time Out New York.

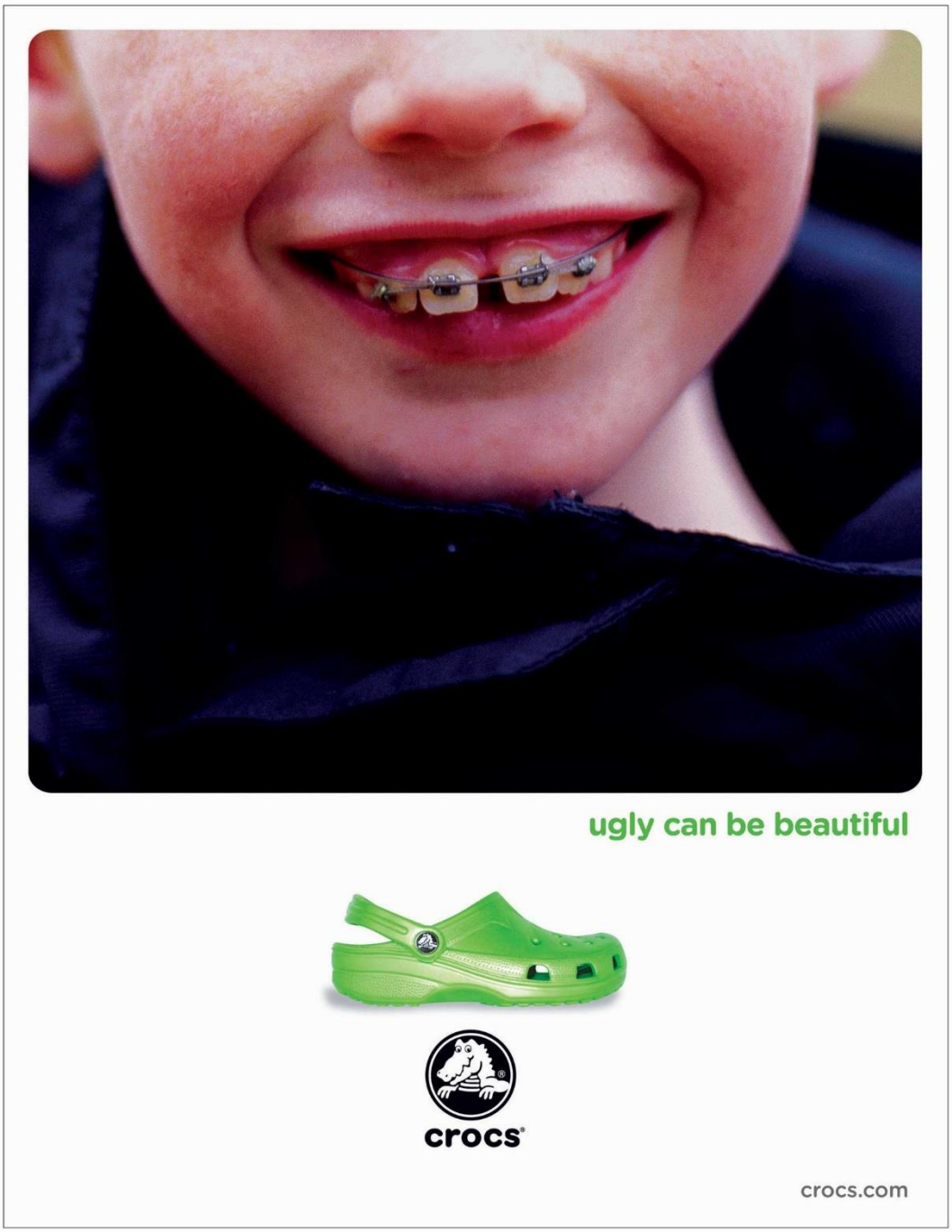


Figure 16

One of the several ad developed for the "Ugly Can Be Beautiful" campaign. From Crocs archive.

Currently Crocs is strengthening the brand identity through the campaign "Find Your Fun", encouraging consumers to share their special moments or adventures they have while wearing Crocs by posting pics on social media. The campaign leverages on the personal way of

experiencing the product and at the same time aim at restore that feeling of simplicity of fun and genuine moment as simple and fun are Crocs' footwear.

At its inception the firm had only one model, the "Beach" (very similar to the current Classic clogs), available in different colours and size (Figure 16).

The products' portfolio of Crocs now counts more than two hundred different models (58 for men, 96 for women and 62 for kids), but the core, most renowned and best sellers are the Classic clogs, the Crocband clogs, then follows the Crocband Flip and other models of boots (Figure 17).

Figure 17

Crocs' most popular products.

Is possible to subdivide the offering in macro families according to the production process adopted, which depends on the material used (Figure 18):

- **Fully Injected**: in this category fall all the models which parts are obtained through the injection in moulds; (Classic clogs, Crocband clogs and Flip)

- **Semi Injected**: the models that belong to this category have both components made out of the injection in moulds and part made out of fabrics; (Yukon, Blitzen and Swiftwater)
- **Fabrics**: models in this category are completely made out of fabrics, like any other common shoes. (Kinsale Chukka and Classic Slipper)

The family that still permit to realize the majority of company's revenues and margin is the Fully Injected: consumers identify the brand whit this kind product and even though crocs has several other model that fall into the Fabrics family, customers switch to other brands when looking for traditional shoes.

Semi Injected are experiencing quite good appreciation by the market since they are easy to wear like the Fully Injected models and has special features given by the component made out of fabrics.

Fully Injected	Semi Injected	Fabrics
		

Figure 18

The figure shows an example pair of shoes for each family of models.

Crocs sell its products all around the world thanks the following distribution channel: wholesale, retail and e-commerce. In financial year 2015, the company realized 54% of the revenue by Wholesale channel, 34% from the Retail and the remaining 12% by E-Commerce activity. These proportions in revenues between distribution channels remain constant also if considering the three macro markets in which Crocs operate: Americas, Asia Pacific and Europe which currently represent only 19% of the total sales.

In developing market growth and expansion strategy, the company is prioritizing six core markets including: United States, Japan, China, South Korea, Germany and the United Kingdom. These countries have been identified as large-scale geographies where Crocs believe the greatest opportunities for growth exist. Accordingly, the product development efforts for 2016 product line are largely focused on expanding market share in these locations. Firm is also

focusing marketing efforts on these regions in an effort to increase customer awareness of both the brand and the full product range.

See Figure 19 to have a picture of sale's volumes in thousands of dollars given the market macro-area and the distribution channel.

Distribution Channel	Revenues by Markets*			
	Americas	Asia Pacific	Europe	**Total**
Wholesale	210.887	255.897	124.227	591.011
Retail	197.306	136.320	44.873	378.499
E-Commerce	68.017	32.274	20.829	121.120
Total	476.210	424.491	189.929	**1.090.630**

* reported in thousands of dollars

Figure 19

The figure shows the volume of sales for distribution channel and markets of years 2015 realized by Crocs as reported in the annual Report on form 10-K.

3.1.3 Structure and Financial Results

Location	Operating Segment that use the property	Use
Niwot, Colorado	Americas	Corporate Headquarters/Regional Office
Boston, Massachusetts	Americas	Global Commercial Center
Leon, Mexico	Americas, Asia Pacific, Europe	Manufacturing/Warehouse/Office
Padova, Italy	Americas, Asia Pacific, Europe	Manufacturing/Warehouse/Office
Hoofddorf, Netherlands	Europe	Regional Office
Shanghai, China	Asia Pacific	Regional Office
Singapore	Asia Pacific	Regional Office
Tokyo, Japan	Asia Pacific	Regional Office
Gordon's Bay, South Africa	Asia Pacific	Warehouse/Office
Shenzen, China	Asia Pacific	Warehouse/Office
Bhiwandi, India	Asia	Warehouse
Narita, Japan	Asia Pacific	Warehouse
Ontario, California	Americas	Warehouse
Rotterdam, Netherlands	Europe	Warehouse

Figure 20

The table list all the proprietary asset of Crocs and their function as reported in the annual Report of 2015 on form 10-K.

The firm operate globally whit proprietary asset, mainly warehouses and office, headquarter settle in Niwot, Colorado (USA), and two production sites, one in Mexico and the other in Italy (Figure 20).

In the years ended December 31, 2015, 2014, and 2013, Crocs manufactured approximately 11.3%, 13.9%, and 15.1%, respectively, of its footwear products internally (Italy and Mexico). The remaining footwear production was sourced from multiple third-party manufacturers, primarily in China, Vietnam, Eastern Europe and South America (*Figure 21*).

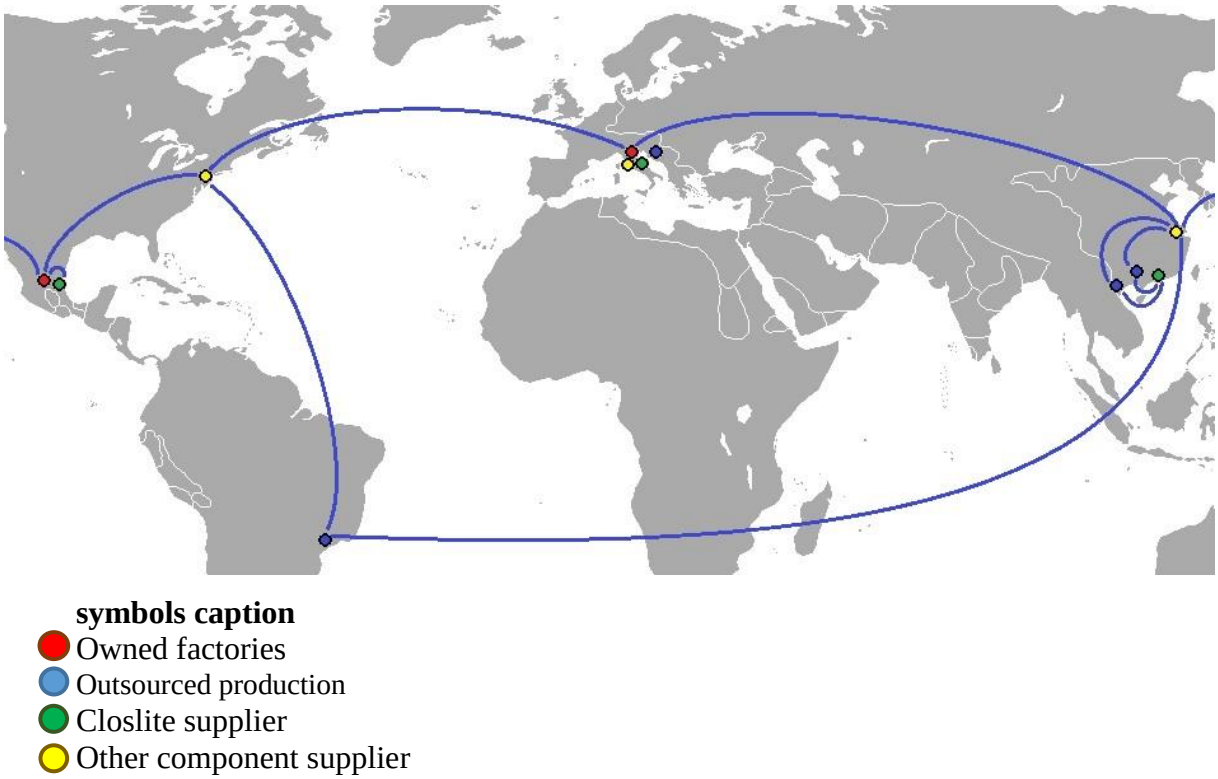


Figure 21
Crocs Inc. suppliers and production sites.

Blue lines link the supplier with the respective factory. The maps allow seeing that Croslite supplier are very close to both owned and third parties' plants: this is because granules are the paramount production factor, and these suppliers decide to include Crocs Inc. among its key customer, establishing a very tight relationship. Yellow points are other kind of suppliers, they are responsible for small components, like rivets, label, special carton box, etc. Crocs Inc. decided to establish one global supplier for the categories mentioned in order to guarantee products' conformity and attain savings due to the volume of purchase among the two owned factories it has and to those of third parties'. These particular items are not voluminous, so it is convenient to make big purchase in term of quantities, also considering the lead-time for shipments around the globe.

During the years ended December 31, 2015, 2014, and 2013, the largest third-party manufacturer in China produced approximately 26.6%, 27.5%, and 28.0%, respectively, of footwear unit volume. Crocs does not have written supply agreements with primary third-party manufacturers in Asia.

Firm's manufacturing strategy is to maintain a flexible, globally diversified, low-cost manufacturing base. The internal manufacturing capabilities enable to rapidly make changes to production, providing flexibility to quickly respond to orders for high demand models and colours throughout the year, while outsourcing allows to capitalize on the efficiencies and cost benefits of using contracted manufacturing services. The management believe that this strategy will continue to minimize production costs, increase overall operating efficiencies, and shorten production and development times.

	Year Ended December 31,		
	2015	2014	2013
		(in thousands)	
Revenues	$ 1,090,630	$ 1,198,223	$ 1,192,680
Cost of sales	579,825	603,893	569,482
Restructuring charges	—	3,985	—
Gross profit	510,805	590,345	623,198
Gross margin %	*46.8%*	*49.3%*	*52.3%*
Selling, general and administrative expenses	559,095	565,712	549,154
Selling, general and administrative expenses as a % of revenue	*51.3%*	*47.2%*	*46.0%*
Restructuring charges	8,728	20,532	—
Asset impairment charges	15,306	8,827	10,949
Income (loss) from operations	$ (72,324)	$ (4,726)	$ 63,095
Income (loss) before income taxes	$ (74,744)	$ (8,549)	$ 59,959
Income tax benefit (expense)	(8,452)	3,623	(49,539)
Net income (loss)	$ (83,196)	$ (4,926)	$ 10,420

Figure 22

The table shows Crocs' financial result of the last three years as reported in the annual Report of 2015 on form 10-K.

In the last two years Crocs has experienced an income loss (Figure 22), mainly due to the China's sales contraction because of the adverse macroeconomic conditions in Asia Pacific (38% of total sales), this resulted in delayed payments of receivables and increased reserves for uncollectable accounts receivable, further, the company experienced volatility in sales in Asia Pacific segment. The strong decrease in the revenue of 2015 (-8,9% compared to 2014) has to

be associated also to the negative effect of foreign currency translation in the European segment and for a further low selling price related to a lower priced product style mix in the Americas.

3.2 Exo Italia s.r.l.

The Italian branch was at the beginning a supplier of Adidas, involved in the production of flip with its own product development office available at the disposal of its customers. Once acquired by Crocs Inc., it has gained a special role within the organizational design of the multinational, it is the only owned facility where product development is carried out closely to the production, hence preserving the always tight bound that there is between this two activities. The two process will be presented below in detail, in order to understand the dynamics that there are between the two.

3.2.1 Production Process

The production process is relatively simple for realizing a pair of Crocs. In this section will be described only the production method that concern the Fully Injected and the Semi Injected families of models. For what concern the Fabrics family, the writer has no direct experience so it will not be presented, on the other hand, for the purposes of the thesis, it is more interesting to explore the process that deploy the usages of moulds.

As previously mentioned, crocs' clogs are made out of Croslite™, which is a patented compound that is injected, once melted, in metal moulds. It is the only raw material required for making a pair of the Classic footwear from Crocs. It comes in granule form, based on expansible and cross-linking polyolefin (Figure 23). It comes already coloured, this mean that Crocs purchase based on quantity, colours and type of compound. In fact, according to the model, different characteristic are required, for example softness/hardness, special characteristics for child usage etc.

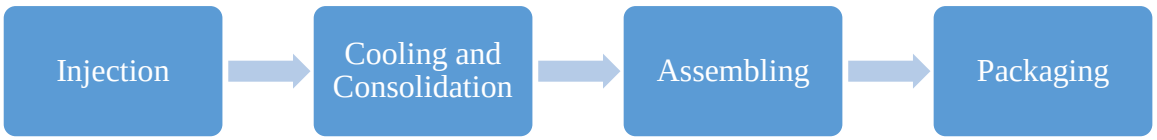
The granules are made out of chemicals than once melted and injected, a non-toxic gas is released, forming micro bubbles and forcing the material to expand evenly in the mould, also occupying the small and thin grooves. The result is a closed cell foam material with a waterproof surface that is highly resistant to wear and deterioration caused by external agents, weathering and ultraviolet radiation.

This material is also environmentally friendly, because it contains no solvents that are harmful to health or the environment, and can therefore be reclaimed and reused in a new production cycle after pulverisation.

Figure 23

The figure shows granules of Croslite™, the main raw material from which Crocs' footwear are made of.

The production process hence is structured in this way:



1) Injecting Croslite™ in moulds

The first phase is of course the injection, the granules are melted and injected in already heated moulds. The mould are made out metal, exteriorly they appear like big block of steel, but when they open for the release of the solidified clogs is possible to see the "negative" of shoe's shape. Before every injection, the stamp has to be cleaned and sprayed whit a vaseline solution to allow the clog to be removed at the opening.

When used, the moulds are inserted in a special machinery, occupying one of the multiple stations available (from 8 to 16), this allow using the same machinery to produce different models simply by changing the moulds.

The machinery has one injector that move from the first to the last station injecting Croslite™. If properly set, the injector can do up to 5 rounds per hour across all the moulds in the machinery (Figure 24) realizing 40 pairs per hour (one pair per mould case).

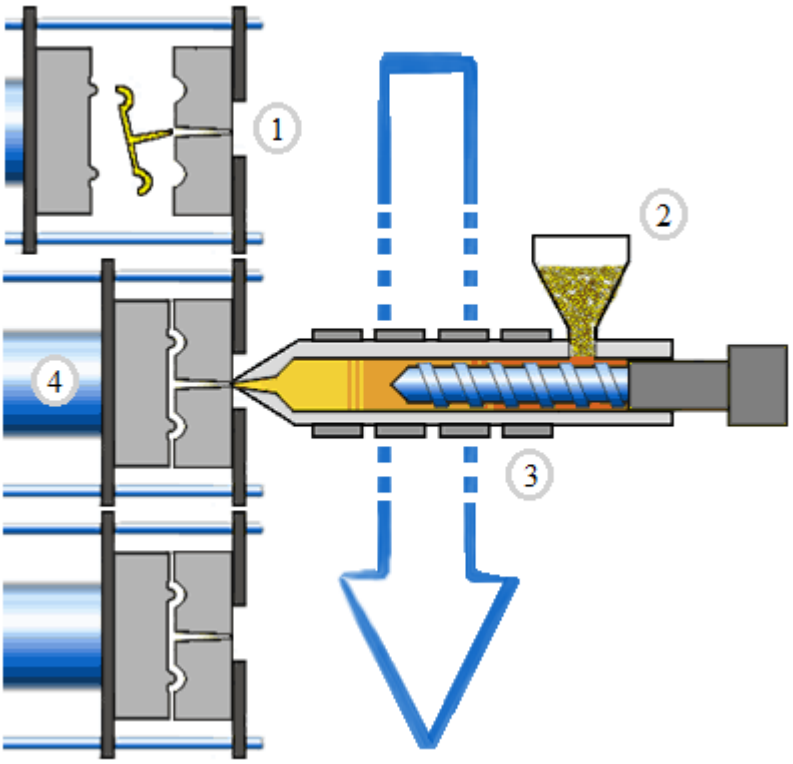


Figure 24

The figure stylized the injection phase. The arrow indicate the injector's (marked with number 3) direction of movement. 1) the mould is opening and the pair of clogs comes out; 2) the injector is equipped with a tank of granules; 4) the mould is heated and ready to be filled with Croslite™.

Figure 25

The figure show a form where clogs are placed for cooling and reticular consolidation.

2) Cooling and Consolidation

In this phase the shoes are very warm and the plastic's reticular structure is still consolidating, so the semi-finished goods are placed on a form that resemble a foot (Figure 25) to cool for the subsequent phase and permit the consolidation at molecular level. The multiple forms where

the clogs rest for cooling are arranged upside-down (it's easier to place the clog) in row that move in accordance whit the output of the injection machine. Foots forms must be changed according to the size of the footwear that is in production (kids model require smaller forms for cooling and consolidating). The personnel who work in the injection phase carry out also this phase, the ratio is 1 operator every 8 station, with a total of 8 employees plus other two for equipment's upkeep.

Once cooled, the shoes are stored in box and moved in the warehouse where the assembly phase take place.

3) Assembly Phase

In this phase, clog and straps (realized with the same method deployed for clogs) are assembled. The clogs are taken out from the box and placed on a rotating rack (Figure 26), firs there is a refinishing, the removal of small imperfections and a first quality check, then, with the auxiliary of a machine, rivets are applied to join clogs with straps.

At the end of the assembly line, there is a final quality check and the application of paper tags.

Figure 26

The figure show a rotating rack for the assembly phase

4) Packaging

This phase take place before the shoes are put in the box, customized packaging are done according to the specific requirement of the client or due to compliance to norm regarding the country where the goods will be sold. People in the assembly phase do the packaging and in

this two phases are deployed two rotating racks, with a total of 12 people plus other 3 that gather boxes, prepare labels and custom packaging for clients.

The overall production process hence is not very complex, the elements on which the planning and production function focus the most is defining the proper mixing of styles, colours and size to produce in order to meet the delivery calendar and guarantee minimum productivity.
The process is indeed flexible, because the raw material are two, Croslite™ and rivets, and the mould production method allow to switch to the production of one model to the other by sampling changing moulds. Same reasoning could be done for the colours matter, even though from switching colour or change series of moulds there is a slight difference in term of setup time for the machine that depends on how many moulds are changed.
The maximum output is 45.000 pairs per week, this quantity decrease as the number of colours and the number of styles produced increase. Including the warehousemen and those in the mechanical workshop that repair moulds, there are 35 workers deployed for the production.

3.2.2 R&D Process

Product development and research are two activity linked very tightly at Crocs because the first rely heavily on the second when developing new product. The offices that do these activities are the "Innovation" and the "Compound", respectively one for the development of new models and the other for the development/research on new compound (Croslite™) in order to respond to new styles' need.
For what concern the "Innovation", there are two moment in the year on which the office present new models: one in the meddle-end of July for the presentation of autumn/winter models, and one in meddle-end of January for the presentation of spring/summer models (*Figure 27*).
During the year, in fact lots of prototyping and wear tests take place. Let's see each of the product development phase that take place.
It all start with the meeting that take place two time a year with the marketing team to analyse new tend and the report by the management control that highlight the top selling model in the different macro market that Crocs Inc. has identified. For this activity, product development manager from Italy spend 1 week in America in the head quarter in Niwot where there is the other Product Development (PD) department. After that week, the conversation for identifying the models to develop continue by Sky chats for other 1-2 weeks (phase 1). The models that will be developed may satisfy different identified need: aesthetical, for performance or for target price to target different customer in the segment.

Once identified 15-20 model to develop, almost a moth pass for sketching is for ideate at aesthetical level the new products (phase2). A weekly review of the Italian designer's activity is done with the American counterpart, which always has the last word in the decision, with the auxiliary of an online platform to share the drawings, to then proceed with the development of the technical features.

Achieved an agreement on the look of the footwear, 3D model is realized for injected clogs or technical drawings for semi-injected or fabrics shoes (phase 3). In this phase, Purchase and Quality Assurance Office co-work with the PD department to identify specific suppliers to satisfy final target price and margins on the footwear.

	Product Development phases	**time required**
1	meeting with marketing team to analyse new trend in the segment and review of top selling product. Identification of 15-20 new model to develop	2-3 weeks
2	Sketching the new model	3-4 weeks
3	Realization of the 3D model	4-5 weeks
4	Realization of prototype	2 weeks
5	Fitting test and review	1 month
6	Modification to prototype if required (material or form due to fit)	1 week
7	Realization of modified prototype	2 weeks
8	Fitting test and review of modified models	1 month
9	Presentation to R&D and Sales Director	

Figure 27

The scheme shows the different phases that take place during the development of new products.

Differently from the traditional shoes company, Crocs develop the pairs with the auxiliary of a software. Even though there are software that allows designing sports or luxury shoes (like Romans Cad *software*) in details, also simulating the stress on fabrics that constitute the vamp and allowing a quick calculation of the industrial cost, such technology is still not widely adopted. The reasons are that these are very sophisticated tools, hence organization face lots of difficulty to find someone that master that skill, further, in the practice, time is very short, and so doing directly a series of prototypes is quicker, allowing to verify the right fitting and to give something tangible to the artistic director of the brand. Crocs, on the contrary, is forced to realize a 3D model because it will be converted in a mould afterward, also for the realization of prototype.

Then prototypes are realized by third parties in 2 weeks (phase 4) and then sent back to the PD office to execute wear test in order to identify any problem that may arise from the use (phase 5). If required, modification are made (phase 6) as new prototypes (phase 7) followed by another round of wear test (phase 8).
Finally, a final presentation is done in the head quarter to decide which of the developed product will be produced (phase 9).

The "Compound" office play its role in the development of new models when looking for certain effects or characteristics (phase 3): for example, it happens in the past that crocs was developing a model to target consumers who works in hospitals, so the firm needed to study a compound that complied with the requirement of safety and hygiene.
During the rest of the year, the "Compound" office constantly monitor the correct preparation of Croslite™ by the supplier and monitor the market of compound and chemicals to find cheaper solution and ascertain possible changes in the price of the supply.

3.4 Sources for the presentation of the Case

The case was presented recurring to the consultation of 2015 Annual Report on form 10-K for the disclosure regarding financial results, the organization structure and certain information regarding the strategy at global level. For all other information regarding the production and the R&D processes, interviews have taken place with key managers within the company involved in such activity and even with the CEO of the Italian branch.

4. Analysis of the Case

4.1 Firm's Manufacturing Strategy vs. Firm's Corporate Strategy

In this section, there will be an assessment on the conduct of crocs regarding the coherence between the corporate strategy and the manufacturing strategy. For having an exhaustive and wide evaluation will be adopted the framework developed by Fine and Hax proposed in the first chapter when discussing the manufacturing strategy, in such a way will be even individuated possible development.

The tool deployed require at firs to consider nine categories that affect the production activity: for what concern the **facilities**, the matter highlighted by the academics relate on the subdivision of products' portfolio. In the case in discussion, Crocs adopts a subdivision of products among production sites according to the family of belonging previously presented, hence following a process type criteria. The rationale behind such decision is to contain costs allocating products that require more labour to countries where the salary are lower, whether by fully outsourcing or subcontracting. In Italy in fact, the product that are produced are those "fully injected", those were there cost of labour per pair is still very low due to the high output.

Concerning the **capacity** matter, Crocs is advantaged due to the relative simplicity beyond the realization of the majority of its products, in fact, it can easily attain extra production capacity by third parties simply transferring moulds. In supporting this argument, the organization reported in 2015 Annual Report that it produces only 11.3% internally without any written agreement with third parties manufacturers in Asia, this also mean that Crocs dispose of flexibility in this dimension.

Looking at the **vertical integration**, Crocs did not do any up-stream acquisition, since the inception the company owned the production activity and the supplier of Croslite™ and small components did not represent a bottle neck in the supply chain neither have strong bargaining power. The only case that is wort mentioning, is the acquisition of Jibbitz in 2006, a company that produced small pins that snap-on to clogs for personalizing and customizing the footwear (Figure 28).

Ron Snyder, at the time President and Chief Executive Officer of Crocs, Inc., commented "We are very excited about this acquisition as we believe Jibbitz represents a tremendous strategic fit for our company. We look forward to leveraging each organization's strengths in order to fully capitalize on the many new and exciting growth opportunities in our future." Continuing on the down-stream acquisition, Crocs opened brand retail in order to reach its customer and giving unique experience of colourful fun.

Pin	Crocs clog with Jibbitz Pin

Figure 28
Crocs' Jibbitz model and pin. From Crocs archive.

Process and technologies played an important role at the very beginning of the company, crocs firs acquired the right on the production process an then the ownership. Now the injection of plastic is widely used, a technology does not present any greater improvement in the near future (both in the machinery and in the chemicals' synthesis), maybe in term of energy consumption reduction, but for what concern the characteristics of the semi-finish good it does not. The production process hence is not very sensitive to this dimension.

Firm's **scope** remain narrowed in footwear products, so the equipment and know how is widely homogenous among subsidiaries, further the wide portfolio is effectively managed because the high variety is indeed constituted of variation of few core models.

Quality management is handled by the constant check of the compound and the moulds. There are few other process that require further control, like the application of striped band on the Croc Band models, but in general all the matter concerning product's quality stay at the beginning of the production process.

Crocs' **infrastructure** respond to the need of a company that manage operation on global scale, establishing clear role for each branch and setting no more than eight level of hierarchy. Each middle management can contact any other manager in its operative segment to manage the different situations that may occur before shipment.

Relationship with suppliers are managed differently according to the kind of raw material: for certain component Crocs has global supplier, meaning that all branches have to buy from them the specific item, for other material instead, Branches may contract freely and according to their need. The reason of having a global supplier is to contain cost and assure homogeneity all across the world for the component, on the other hand this determine consistent lead-time in production.

Human Resources main concern in this company is to find people with outstanding coordination skills, both in the production and in administrative office: for what regard the hard stuff, the shortness of production cycle need perfect balance between the rhythm of the injection phase and the assembly line. Mistaking colour or models in the first phase could cause the stop in the following stage, in fact, injection works in three shifts of 8 hours a day for having an output that cover 1 shift of 8 hours in the assembly line. For what concern the soft stuff, planning and operation need to find space for anticipating or delaying orders, hence nurture a tight collaboration with supplier.

Going ahead in gathering all the elements to evaluate and develop a manufacturing strategy should be analysed the performance of the current manufacturing strategy. Under the perspective of **costs**, CEO of the Italian branch said that the industrial cost should remain low and currently the company is succeeding in this objective even in the Italian branch: the main cost in producing plastic clogs is the cost of fixed asset and electricity, which cost more or less the same everywhere. For other models that require fabrics, cost are less easy to contain due to the material itself and the low volume of production, hence making it difficult to bargain with supplier demanding low quantity. **Quality** is high in relation to the positioning of the product and thanks to the short production cycle that allow constant check on it, customer expect a minimum reliability on the product even though mainly are other the core qualities that the majority looks for when purchasing a pair of Crocs. **Flexibility** is high with regard to the production method described in chapter 3, for the way Crocs' product are conceived, is possible to extend the judgment also to products that deploy the use of fabrics: these products maintain simple line and hence few other phase had to be added. **Time to delivery** is relatively short, within 6 week from when the order is placed and when the commodity get to the store (anywhere in the globe), assuming the hypothesis of 0 stock of semi-finished good, 0 stock of raw material and 0 open order with the supplier. Currently what most affect the time to delivery is the sourcing of Croslite™, it require almost 3 week to be received once placed the order. To be faster as possible, the company develop every month a forecast so that there could be a planning of the volumes in the next 6 months, and does not accept order with shipping date closer than 6-8 week.

Does this manufacturing performance allow pursuing with efficacy the business strategy of Crocs? For answering let us first consider the business strategy reported in the last financial report:

"*We (Crocs) strive to be the global leader in the sale of moulded footwear featuring fun, comfort, color, and functionality*."

Hence, the firm aim to be the first in terms of sales within the business of moulded footwear industry.

Adopting a wider perspective, it could be assert that Crocs belong to the fashion industry, hence competing in an environment that has certain specific trends, which are a
seasonal demand, with tremendous peak and minimum, and volatility of demand.

The first trend make it convenient for the company to outsource all the demand that cannot be absorbed by the capacity of owned factories, which is a percentage of the average yearly demand. Production's output carried internally is constant throughout the year, quantities with certain delivery date can be produced even six month earlier but there is a limit given by the storage capacity. In fact, even if Crocs would be able to produce internally the demanded quantity, the firm will face huge storage costs because the goods will be stock long period before being shipped approaching the season with the peak. Other companies that operate in the same industry, which have higher margin and lower quantities, might find convenient to store their production for 1-2 season.

The second trend instead put the company in the condition to elaborate a strategy for not to face cost of unsold but at the same time avoid lost sales, hence be fast to respond to the shift in demand. The weather has a very strong effect in the decrease or increase of sales. Disposing of own production capacity allow the flexibility required for such circumstances.

Hence, the manufacturing strategy adopted by Crocs is coherent and support the business strategy of Crocs.

The following step in the development/implementation of a manufacturing strategy is the evaluation of **strengths** and **weaknesses** of the current manufacturing strategy for each of the nine categories discussed previously.

Crocs dispose of production **facilities** all around the world, allowing a shorter lead-time for the sourcing of material not supplied by global supplier and shorter time to market. Flexibility in **capacity** requirement throughout the year is assured by the outsourcing, which is relatively easy to do thanks also to the simplicity and linearity of the production process. **Vertical integration**

has been carried out downstream heavily in early years but in the last two lots of brand owned retail stores has been closed for focusing on those that were performing better.

Integration upstream is not strategically relevant: currently, Crocs, thanks to the work carried in the Italian branch, is constantly bargaining with compound suppliers for keeping the cost of raw material as low as possible, this could be done thanks to the continuous monitoring of the chemicals' market and improvements of formulas for realizing compound.

Technology deployed does not seems that will change in the near future, hence assuring a relative longer economic utility of fixed asset.

Scope remain "fashion footwear", but in the opinion of the writer, Crocs should keep focusing exclusively on moulded products, other shoes realized with fabrics does not received such positive response by the markets. There is the further risk of change the positioning of the brand that is solid and evergreen.

In fact, when measuring the **standing position** of Crocs product's line **against competitor**, it is easy to see that for the category of molded clogs, Crocs has a strong position due to the price range and shoe's characteristics, which competitors hardly have in their product's offer. The position of fabrics product by Crocs is weak: customers identify other brand for that category of products.

The following steps in the development and improvement of a manufacturing strategy is considering the possibility of product grouping: how to subdivide the portfolio among facilities for gaining economies of scale.

The first approach is to have "focused factories": factories that produce all the products that share certain characteristics in the production process, for Crocs this would mean grouping the different moulded style in the same factories. In such a way, the plants are focus on one production method, increasing the level of specialization and reducing the complexity of the activity. This might have some drawbacks: the impossibility in the future to shift to a new production method, having a labour force that is able to perform only one few tasks, and the difficulty to transmit and develop in different facilities the same skills.

On the other hand, this is not such a big threat for Crocs. First because it recur heavily to third party for production, hence overcoming the limit of untrained workforce if in need, further because the core and evergreen products by crocs will always deploy the use of mould, leaving to product development and marketing the duty to conquer new customers.

The other approach would be to divide the offering among facilities following the lifecycle criteria: allocating newest products with low diffusion to plant that dispose of the best equipment to exploit the development of an efficient and effective manufacturing method. This last approach suits better those companies that are in the high-tech segment, Crocs in fat adopt

the first approach, separating moulded from fabrics products among factories. Technology for crocs was a constraint at the beginning, but once acquired the right upon the injection method, it does not have further invest in the development of that technology.
Concluding, Crocs is exploiting wisely the internal manufacturing capacity, which also serve the purpose of **benchmarking** its **manufacturing supplier**: having its own production facilities, the management knows costs, methods and time for every production phase deployed, hence giving the possibility to bargain with very low asymmetry if information with third parties.

4.2 Why having R&D in Italy?

EXO Italia s.r.l. is a branch if Crocs Inc., it plays an important role within the whole company because it is the only facility that has production, operation, and R&D all under the same roof. It is a small firm by itself, it does not have the sale and marketing department, but only there is possible to appreciate the relationship between these three elements that otherwise are separate within the same company.
At the beginning, Crocs decided to acquire EXO s.r.l. not only for having a direct production facility in Europe, but also for the capabilities of the Italian firm in the development of injected shoes. Hence, since from the beginning Crocs was looking for expanding it's design and development capability whit the advantage of having also two tight linked function close to each other, production and product development.
Currently, only in Niwot and Italy the International firm is carrying out the R&D activity, and EXO is advantaged because it can directly test the mould in production. EXO s.r.l. provide shorten time for test series of new mould at the introduction of new styles.
Last, but not least, even for this particular range of products, the Italian sensibility for the development of new line is appreciated by the other product development office located oversee which lead the development of new project and has the last word on the birth of a new style.
The modularity between design and production allow the American counterpart to develop some project first in the office and then moving to China to laboratories specialized in fast prototyping. But still, being in direct contact with the machines, allow the technical engineer to adjust promptly some technical features that they have to consider during the realization of the mould.
Summing up, Crocs Inc. was seeking new knowledge, certainly not technological, but rather something that has more artistic connotation, the design, that is inimitable and unique. Further, the multinational was able to enjoy the closeness between the two function, helping in the

identification of the proper supplier for having an effective management of the costs thanks to the involvement during the decision concerning some special material.
Continuing on the modularity matter, it can be asserted that Crocs fall in the category of those companies that has high process modularity and reach the maturity in the production process. The majority of the R&D activity, in fact, concern the pure innovation of the product rather than the development of the technology behind and incorporated in it.

4.2 Conclusion

Living a working experience in the Italian branch gives a privileged view on the main activity that regard the realization of the product: product development and production.
Recurring to the model proposed by Mudambi, is easier to understand the strategic choices by Crocs: EXO Italia s.r.l., along with the Mexican production facility, are in fact an exception to the manufacturing strategy of the company. The two factories serve the purpose of benchmarking suppliers, allow a bit more of production flexibility for the management of purchase orders, and support the R&D activity. Wide part of the production is outsourced, hence, the activity that has lower value added is located according to a cost reducing criteria, in far east countries.
Under Caniato's et al. framework perspective, the strategic choice of Crocs Inc. seem coherent with the findings of the Italian researchers. The activity's level of criticality is very low due to the nature of the production method, hence outsourcing seem the best alternative, even to gain flexibility in terms of production capacity.
Going further on the type of production method (assembly line), high maturity and modularity, does not give any space for innovation, so outsourcing does not threat the organization of losing innovation opportunities in process and/or the product itself. Those activities that generate the bigger portion of the final are retained within the company, with two office, one in Italy and one in Colorado (U.S.A.). Such a choice enable the multinational to draw from its former style and development core characteristic and attribute but at the same time dispose of that "Italian", or European, touch for developing the footwear with the eyes and the passion proper of a continent that has always play a relevant role in the fashion industry.
Localization of R&D hence is driven by the mean of disposing of unique tacit knowledge, more widely speaking, an intangible asset that can not be transferred.
Having product development and production close to each other, allow the company to manage effectively, under the perspective of cost efficiency, certain product which has low volume of production due to the peculiarity: an example could be the "Rainfloe Bootie", a boots that EXO

Italia s.r.l. produce, satisfying the global demand for that specific article. In the development phase, during the selection of the materials, the purchase team was promptly involved to identify a supplier, which allowed a certain margin over a target price and reduce variability in the supplier performance. This circumstance already described reflect the observation made by Olausson et al. (2009) when describing the challenges an R&D team has to face according to the degree of newness of the task performed in relation to the level of vertical integration.

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