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**StrategyMatrixes as Technical Objects: Using the Simondonian concepts of concretization, *milieu*, allagmaticprinciples and transindividuality in a business strategy context.**

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## **Strategy matrixes as technical objects: Using the Simondonian concepts of concretization, *milieu*, allagmatic principles and transindividuality in a strategic management context.**

In this study of the genesis of strategy matrixes, which is based on methodologically collected archives, we look at how management tools can be considered technical objects, under the definition put forward by philosopher Gilbert Simondon.

Through that lens, we consider the example of a strategy matrix taken as a ‘technical individual’ that is singularly striving to become itself, which can mean success, disappearance or reappearance. That becomingness can be explained by considering the object’s ‘degree of concretization’ and its capacity to give rise to its own ‘milieu.’ Four stages are involved, in which strategy matrixes can be classified in terms of undergoing a ‘technical genesis.’ In taking another theoretical perspective, we will broaden our discussion to look at technical culture, while borrowing from Simondon’s notion of ‘transindividuality.’ Lastly, moving to epistemological issues, we revisit Simondon’s take on allagmatic principles and examine their complementarity with Michel Foucault’s conception of archeology.

Keywords: Simondon; strategy matrix; transindividual

Subject classification codes: xxx?

### **Introduction**

To date, most management research papers drawing on the work of Gilbert Simondon have relied, chiefly, on a single text, *On the Mode of Existence of Technical Objects* (1958), which was, in fact, the philosopher’s second and ancillary doctoral thesis. To get to the core of Simondon’s thinking we must turn to a seminal and far more challenging work, which is his first and main thesis: *Individuation in the light of the notions of Form and Information*. Simondon never succeeded in having it published in his lifetime, due to serious health problems that persisted until his death in 1989. His full thesis, as well as other equally important philosophical tracts, was not published until quite recently (Simondon 2005). In the meantime, the great originality and wealth of his thinking became a source of inspiration for a small circle of no

less thinker than Edgar Morin and Bruno Latour (Barthélémy, 2014, 180-186). But only Stiegler (1994, 1996, 2001, 2004, 2006) has truly delved into Simondon's ideas headlong, while openly declaring himself a Simondonian. More recently, his focus has been squarely on proletarianization seen through a pattern of alienation, as witnessed in relations between man and the technical object (or technological system), described by Simondon in his secondary thesis (1958, 328-329, 337). In relying not only on Simondon's secondary thesis, but also on notions developed in his main thesis, including some fundamental schema and concepts found there, this paper seeks to make a novel contribution to management research by taking a broader approach to Simondon than has been the case with studies undertaken so far.

The empirical data used in this paper consist of archival material that allow us to trace the emergence in France of a field of knowledge that underlies strategic management studies. In the modernizing upheaval of the post-war years, strategic management tools appeared there amid the rise of a "field," as defined by Bourdieu (1996: 61), that was fraught with disputes about legitimacy; and it exhibited "metastable" inner and outer surroundings, or *amiliieu*, as defined by Simondon (2005: 16, 32-33), all of which proved conducive to the crystallization of new ways of thinking. In what was a largely local, intellectual breeding ground (albeit one open to certain outside influences), a debate of ideas eventually gave rise to what Michel Foucault termed a *savoir* (1969 : 238) in terms of organizational strategy materials; namely, a set of objects, modes of expression, concepts and theoretical choices shaped according to their own, specific body of rules.

In keeping with Michel Foucault's "archaeological" approach, which is driven by data collection, we reviewed a set of post-war academic, specialist and institutional literature up until 1975, when the field of strategic management studies seems to have

become relatively stable, or at least had attained metastability, as far as its rationale and discursive rules were concerned.

The author conducted an initial Foucauldian analysis of this material, as part of an extensive research study, whose results remain unpublished and have not yet been translated into English. For our present purposes, we have returned to that material, recognizing it as an important trace back to a metastable system of knowledge in a structuration stage, where management-related technical objects were being created.

(1) Using those archives, this paper focuses on analyzing the technicity and degree of individuation behind strategic matrixes, while looking at how they originated. Hence, we have tested and validated the relevancy of evaluating an abstract, cognitively management-related object by reference to a scale that Simondon had developed for concrete technical objects. We also show that the “concretization” and “technicity” categories have retained their relevancy for studying the production of new managerial matrixes in a variety of cultural contexts.

(2) Our findings call for an initial, theoretical discussion, concerning the notion of technical culture. Specifically, we shall see how the Simondonian notion of transindividualism makes it possible to address factors governing the emergence and transmission of these objects.

(3) In a second discussion, on epistemological issues, Foucauldian archeology and Simondonian allagmatic principles will be contrasted in terms of how they open up new insights or tensions regarding the strategic matrix. Such an exercise is possible because the genesis of a management-related technical object brings into play, simultaneously, principles of both operation and structure. It also, offers management a valuable glimpse into the realm that is occupied by what Simondon calls the *essence of technicity* (Simondon, 1958, 214).

## **1. Genesis and concretization of strategy matrixes in the French industrial and institutional milieu**

Can strategy matrixes be studied as technical objects and, if so, to what extent do Simondonian concepts help explain their success, manner of use, and limitations? In addressing that question, we shall examine in (1.1) how Simondon uses the notions of technicity and the technical individual in relation to material objects, which allow these concepts to be applied to abstract technological objects. Then, in (1.2) using an archive of strategy-related knowledge defined according to certain, specific parameters, we shall examine technicity and degree of individuation in the context of strategy matrixes. Lastly, in (1.3) we will try to determine the extent to which matrixes do or do not develop their own technological milieus, as they are transmitted across most every continent and cultural context.

### ***1.1. The Simondonian notion of Technicity: ontology, the individual and milieu.***

Simondon defines three stages underpinning the ontological status of technology by introducing the differences between "technical (or technological) elements," "technical individuals," and "technical totalities" or "ensembles." The isolated, individual technological object is comprised of technological elements, or components; and, for the purposes of broad-scale fabrication and applications, the object must be brought together with a variety of other technological objects and integrated into a vast installation, or ensemble.

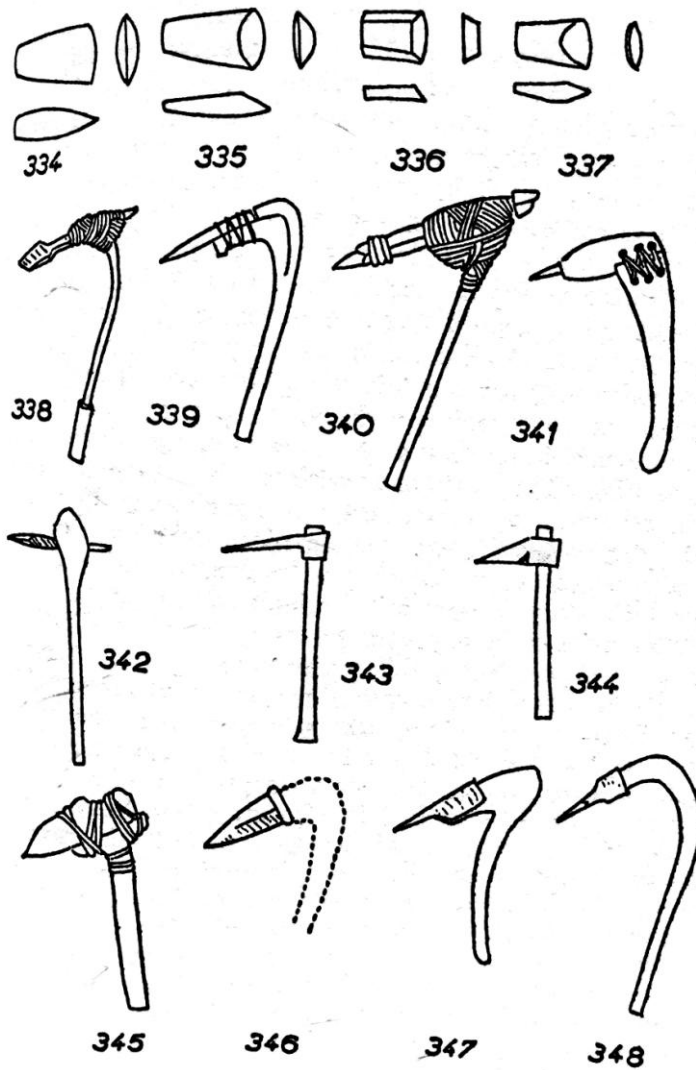


Figure 1: Different versions of a technological object, the adze, by Leroi-Gourhan (1971 [1943], p. 187).

The mature technological object, as described by Simondon, would appear to correspond to adze n° 343.

To illustrate this point, while drawing on a related study undertaken by André Leroi-Gourhan [1943] (1971, 184-189), let us consider how Simondon looks at the process of development of the seemingly simple woodworking tool, the adze (Simondon, 1958, 89-89):

- The technological elements of the adze consist not only of its various physical parts (the blade and the shaft) but also the convergence of the totality of each of its functions as a tool: “a cutting edge,” “a heavy, flat part that runs from the socket to the cutting edge,” and “a cutting edge that is more strongly steel-plated than any other part”
- The adze is a technical individual because it is a unity of constituent elements that are brought together to generate a productive “resonance,” as each part is held in place by, and supports, the other, to ensure correct functioning and offer resistance against the forces of wear and tear:

“The molecular chains in the metal have a certain orientation which varies according to location, as is the case with wood whose fibers are so positioned as to give the greatest solidity and elasticity, especially in the middle sections between the cutting edge and the heavy flat section extending from the socket to the cutting edge; this area close to the cutting edge becomes elastically deformed during woodworking because it acts as wedge and lever on the piece of wood in the lifting process.”

It is as if this tool “as a whole were made of a plurality of differently functioning zones soldered together.”

- The adze-as-technical-object is totally inconceivable, and could not have been manufactured efficiently, had it not been for the technical ensemble that gave it its shape and was ultimately transmitted across time:

The tool is not made of matter and form only; it is made of technical elements developed in accordance with a certain scheme of functioning and assembled as a



stable structure by the manufacturing process. The tool retains in itself the result of the functioning of a technical ensemble. The production of a good adze requires the technical ensemble of the foundry, the forge, and the quench hardening process.

That three-stage ontology of element-individual-ensemble is behind what Simondon terms the technicity of the object, and this is what makes it possible to generalize the concept beyond material objects alone: it is made of “technical elements developed according to a certain scheme of functioning and assembled as a stable structure by the manufacturing process.”<sup>1</sup> Technical objects exhibit “qualities that relate neither to pure matter nor to pure form, but that belong to the intermediary level of schemes” (Simondon, 1958, p. 92). Technicity has much more to do with the relational than the material<sup>2</sup>: that is, the technological object is nothing more than an ensemble of relationships between technical elements, as expressed in thought, that are established, implemented then repeatedly reintroduced, re-activated. And the ensemble drives its design, manufacture, use and maintenance.

For Simondon, technicity is a rich and complex notion: there are degrees of technicity, and through the process he dubs as *concretization*, an object evolves and becomes increasingly technical. As Simondon uses the term, it is not at all to be taken in direct opposition with the notion of abstraction. Concretization of a technical object occurs through a series of improvements, which can sometimes be progressive and incremental, or sometimes even brutal, as an object condenses each of the various functions into a tighter and tighter cohesion, using fewer constitutive elements, holding out

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<sup>2</sup> This relationship is not inconsistent with realistic metaphysics. Although Simondon did not advocate substantialism, he adhered to the philosophy of a “realism of relationships” (Barthélémy, 2008: 18-34).

the possibility of enhanced performance, greater structural integrity, better reliability and optimal productivity of manufacture: “with each structural element performing several functions instead of just one” (Simondon, 1958, p. 37). Under concretization, as each technical element grows in sophistication, another process, called *individuation*, ensures, simultaneously, that the technical object becomes indivisible and autonomous, in the technical field. In the case of cathode tubes, for example, “the successive precisions and reinforcements incorporated into this system serve to counter any unforeseen drawbacks that arise during its use and transform improvements into stable features” (pp. 36-37). In that light, “modern electronic tubes” can be seen as more individualized objects, because they are more concretized than the “primitive triode” (ibid.).

In the world of technical objects, the different degrees of technicity reflect a more general Simondonian ontology, which introduces several stages of individuation (Simondon, 2005). For Simondon, an individual, that is, any given entity, is never really complete but is constantly engaged in a process of becoming. In the Simondonian ontology, the question of being or not being an individual is a side issue. It is more salient to ask whether an entity is or is not engaged in the process of individuation, whereby a technical object, for example, tends to become more and more of an individual. In that perspective, there is no stable, static, individual/non-individual dichotomy but, rather, successive degrees of individuation or dis-individuation, with the death of a human being, and the attendant decomposition, being a prime illustration.

Moreover, technical objects cannot undergo further individuation without progressively co-creating their associated environment, or *milieu*. The *milieu* is a part of the technical object’s (and also the human being’s) surroundings, and, whenever it is sufficiently close to the object, it contributes to its creation, potentially to the point

of modifying its basic attributes, while also providing the object with the resources needed for its proper functioning. That is a singular notion insofar as it challenges the entity vs. environment duality traditionally invoked in management science or the inside versus outside dichotomy found in modern life sciences. Indeed, just as living beings have their own *interior milieu*<sup>3</sup> where the workings of their vital mechanisms depend on an extra-cellular fluid environment (not unlike the saltwater sea environment that harbored the first single-celled organisms), technical individuals develop in conjunction with their environment, which is both within and without. It is in those exact terms that Simondon explains the technical object of the 1950s (1958, p. 70):

The associated milieu is the mediator of the relationship between manufactured technical elements and natural elements within which the technical being functions. That is not unlike the ensemble created by oil and water in motion within the Guimbal turbine and around it.

That idea is of paramount importance in understanding the triadic concept of the technical element, the technical individual and the technical ensemble. An individual can be identified by the unity of its associated milieu. That is, on the individual level, technical elements “do not have an associated milieu” (Simondon, 1958, p. 80), whereas technical ensembles do not depend on any one, single milieu: “We can identify a technical individual when the associated milieu exists as prerequisite of its functioning, and we can identify an ensemble when the opposite is the case.” (Simondon, 1958, p. 75).

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3. “The living being is an individual that brings with it its associated milieu” (Simondon, 1958, p. 71)

## *1.2 The technicity of strategy matrixes: an overview of their genesis based on archives obtained from the field in post-war France.*

The archives that we have compiled consist of the entire set of strategy-related literature published in France, from 1945 to 1976. For the sake of completeness, relevant texts and periodicals from the national library, the *Bibliothèque Nationale de France* (BNF), have also been included. The list of the 200 archives, selected from among thousands of brochures, periodicals and other texts, as well as their content, has been kept available for scientific reference. Our selection was guided by the idea that “strategists” are those who attempt to describe management-strategy-related practices or theory for market actors who are not directly affected by the strategy itself—usually, academics, journalists, business gurus and popularizers of business strategy, etc. In that period, well before the three leading strategy consulting firms (BDG, ADL, McKinsey) appeared on the scene in France and introduced highly elaborate strategy tools, there was a relatively rich variety of local, strategically-focused firms producing their own matrixes. After looking at documents focusing specifically on corporate strategy, we drew up the following list, which we have presented in chronological order (each matrix is covered by a separate monographic study, shown in Appendixes 1 through 6):

- “Sadoc’s Table of Ongoing Adaptation to Market Changes” (Gélinier, 1963.) See Appendix 1.
- The “Panther/Elephant” Matrix (Charmont, 1970), See Appendix 2
- A French translation of the “Ansoff Product/Market Growth Matrix” for Concentric Diversification (1970). See Appendix 3.
- “Morphological Boxes” and “Morphological Territories” (Dupont, 1970). See Appendix 4.

- The “Houssiaux Matrix” for analyzing relations between multinational business enterprises and national governments (Houssiaux, 1970). See Appendix 5.
- The “Bijon matrix” analyzing the link between firms’ profitability and market share (Bijon, 1971). See Appendix 6.

Out of all of these strategic analysis tools, only the American models, which have since been translated into French (Ansoff, 1970), have stood the test of time and continue to serve as key reference guides for strategy professionals and instructors alike (see Appendix 7). Unfortunately, all purely French-designed models have fallen into obscurity, even though the range of strategic options they offer is as broad as those found in both contemporary and subsequent American tools (which is the case, most notably, with the Sadoc/Gélinier matrix (1963)). One can only wonder if cultural bias played a role in this turn of events, where American culture’s soft power eventually swept away everything in its path.

Of course, that would be a far too simplistic explanation. More intriguingly, and more pertinent to our current discussion, is the role played by technical culture, under the definition put forward by Simondon (1958). All of these matrixes (i) share most of their technical elements in common and (ii) can be classified into technical ensembles with considerable overlap. Yet (iii) they differ greatly in terms of their degrees of concretization and the intensity of the role played by their *milieu*. To paraphrase sociologist Bruno Latour, it “puts down the entire world on a flimsy sheet of paper,” [2006, 57]).

*(i) Technical elements common to most matrix ensembles.*

All of the matrixes under study give a composite picture of market position in relation to a relatively high number of strategic choices (16 under the Houssiaux matrix), using

a two-dimensional chart that facilitates memorization and ranking. The technical elements of a matrix are thus extremely simple: two axes, with segmentation variables, yielding a two-dimensional segmentation result. It should be noted, however, that, depending on the matrixes, some elements are more specialized and sophisticated than others. Whereas the morphological boxes (Appendix 4) and the panther/elephant matrix (Appendix 1) have axes that are fully segmented, alternating between different types of strategic parameters, others use graduated scales: identifying products at a greater or lesser remove from the company's current line of activity, in the case of the Ansoff matrix (Appendix 3); degree of centralization of state regulatory policies, in the case of the Houssiaux matrix (Appendix 5); graduation of one of the two axes (phase of the product life cycle) in the case of Gélinier's "Table of Adaptation to Market Changes" (Appendix 2).

These same basic elements continue to appear in subsequent or newer strategy planning models, as a simple bibliographical search reveals. Entering a query into the EBSCO Business Source Premier database, using the key words "strategy" and "matrix" and the Boolean search operators "and" and "or," yielded 70 articles recently published by academic journals. Of those, 14 display strategic choice matrixes, some of which deal with "marketing strategy" but use a similar matrix structure. And it should be noted that some recent matrixes are "skewed": the polarity of one of the axes is reversed in relation to the orthogonal axis, making it difficult to track a diagonal gradient (e.g. Azmi, 2008). But they are notable less for the elements they contain than their arrangement. However that may be, these matrixes have been analyzed and included in

the list annexed in Appendix 7, and illustrated in Appendix 8<sup>4</sup>.

*(ii) Technical ensembles that are found in virtually every matrix and fall within the scope of a metastable discourse specific to Post-War France*

The axis of each matrix typically included a range of economic or institutional factors necessary to build a strategic knowledge base, well before the three major, classic Anglo-American models were introduced, as we showed in a previous paper on these archives (Author). Previously, after collecting archival literature and analyzing it in relation to Michel Foucault's archeological approach, we examined the institutional conditions that made it possible for the object of knowledge—the firm's strategic choice—to emerge and be identified. In addition, we explored how it became possible to classify various strategic choices by categories. That discursive and institutional ensemble that gave rise to the 'strategic choice' as object of knowledge is, in our view, the technical ensemble in which the object "strategic matrix" has been created.

It must be borne in mind that a special set of circumstances prevailed in postwar France, as the State and business enterprises vied to become the sole, fixed point of reference for stakeholders, when making commercial/economic decisions. At issue was the question of who should ultimately hold sway over management thinking, either the State (Massé, 1954; Macaux, 1955), trade unions (Pouderoux, p. 242), employers and business managers (Termont, 1955; Macaux, 1955; Demonque, 1966) or consultants (Gélinier, 1956). The country's industrial economy, which had been largely imported from Anglo-

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<sup>4</sup>These visual depictions follow the example of Simondon's technical Atlas, which was used to support his arguments (Simondon, 1958, 1968).

American models, offered at least a discursive answer to the question, well before the writings of Michael Porter appeared between 1970 and 1980. Notably, the French translation of Edith Penrose's *The Theory of the Growth of the Firm*, in 1961, offered valuable insight into the interplay between growth, profitability, firm size and the industrial sector, which underlay "standard strategy scenarios" (e.g. Gélinaud, 1964), established by French strategists. Penrose's work also helped resolve some of the above-mentioned controversies that had embroiled French institutions, regarding who would serve as the point of reference and undertake decision-making initiatives. The formulation of standard strategy scenarios also gave new life to information and reporting plans as well as the tenor of economic debate, by refocusing them on the now-legitimate pursuit of corporate success.

In sum, despite cultural particularities, the intensifying competitive pressure on business enterprises, coupled with the ability to collect sectoral economic data, created a metastable setting such that the technical object "matrix" gained utility and could be produced locally by different authors (albeit with certain variations), although technical elements were virtually, if not entirely, identical.

*(iii) Sharply contrasting degrees of concretization.*

The study of matrixes that emerged in the French discursive sphere during the postwar period highlighted several functions or operations (see Appendix monographs n°1 to n°6), which converged toward legitimizing the choices made by executive management and reinforcing its ability to use arguments to exhibit its mastery of the complex and changing reality of the organizational environment:

- *Compressing function*, insofar as matrixes offer the corporate manager several succinct criteria for decision-making and control, making it possible to reduce



the number of profit-generating/growth factors at the corporate level, keeping only those that appear to be relevant;

- *Linking function*, because matrixes render the changing situation of the business enterprise more comprehensible through their invariant laws, which allows simplicity to guide complex choices;
- *Totalizing function*, offering the company director the assurance that linking could apply to a seamless, boundless world.

However, as was the case for material technical objects that were studied by Simondon, the capacity to deliver these properties in abstract technical objects, such as strategy matrixes, was bound to generate unexpected or “unlooked-for side effects” (Simondon, 1958, p. 40). And there are, indeed, a number of underlying tensions between each of the three principal properties of the strategic object:

- The tension between the compressing and totalizing: Is it possible to give a condensed overview of corporate courses of actions and financial performance and, at the same time, describe the totality of strategy factors? That is what explains the continual oscillation between highly reductive 4-box matrixes, and 9- or 16-box models intended to describe reality in more detail.
- The tension between linking and totalizing: the orientation toward totalizing leads to embracing an overly broad picture of reality, as variables are so numerous and disparate that linking them becomes impossible. As a result, it is difficult to understand how an elaborated Houssiaux matrix (Appendix 5), for example, can serve as a guide for management in arbitrating differences and establishing priorities between the overseas subsidiaries of a multinational firm positioned in various boxes of the matrix.
- The tension between linking and compressing: this occurs as the ideal of finding the “one best way” of taking a course of action, on the one hand, is pitted against the ideal of the firm that can remain flexible and open to active participation by stakeholders. The typological matrixes such as the panther/elephant matrix (Charmont, 1970) are cruel reminders of that difficulty.

These tensions can be resolved more or less successfully depending on the matrixes

employed. Indeed, according to how they are arranged, the technical elements of certain matrixes can serve multi-functional and complementary purposes, including acting as sources of mediation, which are aimed at alleviating these tensions:

- *Categorization, mediation between compressing and linking.*

The intersection between two segmented axes brings about a coincidence between two company-related typologies, and a kind of natural correspondence seems to develop between them. Typically, in the panther/elephant matrix (Appendix 1) or in the Houssiaux matrix (Appendix 5) that categorization generates an action-reaction type linking schema. That is, these matrixes gave rise to a series of connections between certain types of courses of action adopted by rival firms and the (state-controlled) contextual settings, on the one hand, and strategic counter-measures or responses, on the other.
- *Hierarchical ordering, or mediation between linking and totalizing.* For centuries, science has striven to decipher and manipulate nature by trial and error. The classic examples for engineering specialists are Taylor expansions, which make it possible to approximate most functions as closely as one wishes by simply adding a series of *functions with increasing exponentials* ( $x$ ,  $x^2$ ,  $x^3$ , etc.). This approach, which involves making repeated adjustments until the formula converges toward a fixed point, relies on applying a hierarchy: the coefficient is determined for  $x$ , where the degree of  $x$  is one, then two, then three, etc., until the desired level of precision is reached. In a quite similar fashion, a hierarchy can be applied to approximate as closely as desired a reality that is never entirely attainable. None of those mechanisms used to perform partial totalizations would work, was is
- not possible to prioritize the descriptive parameters from the most important to the least important. The ranking of criteria must be seen then, to a lesser degree, as a form of totalizing that opens a zone of reconciliation in which linking and totalizing can co-exist. Matrixes whose axes are not only segmented according to A, B C, etc., but also graduated between a pole that minimizes the value of a parameter and another that maximizes it (e.g.: a product that is more or less different from the firm's current line of activity in the Ansoff matrix [Appendix 3], or a State that is

more or less authoritative in the Houssiaux matrix) apply such a hierarchical ordering.

- *Interpolation, or mediation between totalizing and compressing.* Graduated axes, particularly when they present a continuum of options, like the horizontal axis of the Ansoff matrix (1970), use a linear interpolation, i.e. showing intermediate categories at finer and finer intervals along the matrix's generating axis. By offering a spectrum of options, ranging between two extremes, it is possible to play very locally with economies of scale, when greater precision is desired. When that logic is taken to the extreme, a continuous gradient appears in the matrix, for example in Morphological Territory or in the "concentric diversifications" cell of the Ansoff matrix.

All three means of 'tension-dampening' can be achieved at the same time through a single technical configuration, which we see in both the Ansoff matrix and the Houssiaux matrix, as well as in the matrixes created in the 1970s (BCG, ADL and McKinsey) and even in more recent examples (e.g. the "Entrepreneurial Strategy Matrix" [Sonfield & Lussier, 1997, Sonfield *et al.*, 2001], and the "Etnographic Strategic Matrix" [Paramo Morales, 2005]). There is a diagonal line that is clearly implied though not expressed explicitly in the matrix, emerging from the *milieu* sector of the matrix, as in the case of the Ansoff model (1970), which serves as a first example (see Appendix 3). Indeed, through the diagonal gradient, these matrixes present all strategic options in successive strata, whether in continuous, discrete, or cumulative series. However, stratifying data can involve arranging it in hierarchical order (between a lower and higher graded status) as well as dividing it into categories (because there are different ranges or strata of data). It can also entail interpolation, because intermediate levels or grades of sample data can be represented spatially in the form of a radial (stratified) graph (polar visibility graph) or a rectilinearly layered (stratified) drawing, (see figures below), making it possible to create a multi-scale visualization, so that a viewer can zoom-in for a more detailed view.

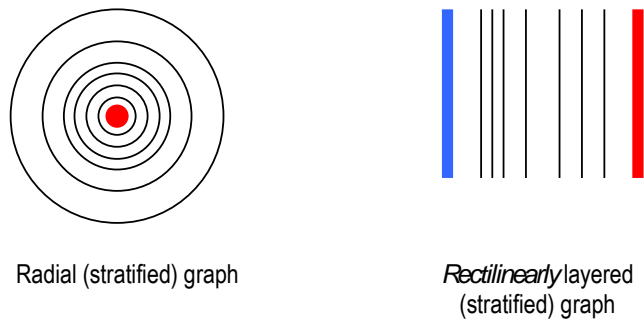


Figure 2. Two types of stratification graphs

In a way, stratification is a means of *concretization*, under Simondon's meaning of the term, regrouping the three processes of categorization, hierarchical ordering and interpolation.

Stratification is performed more or less efficiently depending on the matrix. The models that suggest a natural tendency through a gradient rising from the upper left corner of the matrix toward the lower right-hand corner (as in the Ansoff matrix or the BCG matrix) appeal to the natural inclination of readers in the West to read from left to right and from top to bottom. The matrixes that are arranged otherwise are more likely to be viewed as awkward and, therefore, less technically refined, such as the Bijon matrix (1971), which presents the same types of options as the BCG matrix (see Appendix 6), but with less technical efficiency.

After identifying the operations carried out by each matrix element, for the French sample, we have highlighted the contrasts that can be distinguished in terms of concretization. (Chart below)

			Basic Operation			Conflict-reducing Mechanisms			
	Technical Object	Technical Elements	Totalizing	Compressing	Linking	Classify by category	Arrange in Hierarchical Order	Interpolate	Stratify
Stage I	Morphological Box (Appendix 4)	Horizontal Axis Vertical Axis Demarcate d Milieu	X		X	X			
	Panther/ Elephant Matrix (Appendix 2)	Horizontal Axis Vertical Axis Demarcate d Milieu	X	X		X			
Stage II	Sadoc/Géli nierMatrix (Appendix 1)	Horizontal Axis Vertical Axis Demarcate d Milieu	X	X		X	X		
	Morphological Territory( Appendix 4)	Horizontal Axis Vertical Axis Demarcate d Milieu	X	X			X	X	
Stage III	Ansoff matrix (Appendix 3)	Horizontal Axis Vertical Axis Demarcate d Milieu	X	X		X	X	X	
Stage IV	Bijon matrix (Appendix 5)	Horizontal Axis Vertical Axis Axe Diagonal Milieu	X	X		X	X		X

Table 1: The Strategy Matrix as Technical Object, viewed by degrees of intensifying concretization and stages of development

By arranging these matrixes according to the number of functions performed simultaneously in each matrix element, and according to the associated milieu, we can identify the different degrees of concretization that steadily intensify as we move from the morphological box toward the Ansoff matrix. Although the Bijon matrix closely resembles the latter, in functional terms, it boasts an additional technical element (the diagonal axis), which tends to dilute the functions carried out by the two orthogonal axes and confuse the reader regarding their milieu of interaction. Thus, it cannot be seen as an advancement compared to the Ansoff matrix, but is, instead, a regression. Because it includes an additional axis to show a *diagonal gradient*, the Bijon matrix is closer to the ideal-type model of the “primitive and abstract” technical object where “each structure has a clearly defined function, and, generally, a single one” (Simondon, 1958: 41). The Ansoff matrix, whose finely graduated and polarized axes act in synergy with a milieu that follows the reader’s natural points of orientation (left-right, up-down) is enough to suggest a concentric gradient of diversification, belongs to a more “concrete” stage. Importantly, it meets the criterion laid out by Simondon (1958: 41) whereby “a function can be performed by a number of synergistically associated structures,” whereas, through the corresponding milieu that is established, “each structure performs ... essential and positive functions that are integrated into the functioning of the ensemble” (ibid:41). Lastly, the Ansoff matrix also exhibits this same type of refinement, which ultimately “reduces the residual antagonisms that subsist between the functions” (ibid.:46). The finer and finer graduations on each axis give rise to (1) hierarchical ordering and (2) interpolation, which reduce the residual incompatibilities that exist between the functions, namely, (1) between linking and totalizing, and (2) between totalizing and compressing.

This chart is not intended to recount the history of matrix models (especially since no

chronological order is given) but, rather, to identify their *technical genesis*, which, in the interest of simplicity, has been broken down into different stages of concretization: stage (I) marked by the emergence of the box, using the example of morphological box and the panther/elephant matrix; stage (II) which saw the introduction of the incomplete-gradient matrix, illustrated by the Gélilier/Sadoc matrix and the morphological territories; stage III marked by the diagonal-gradient matrix making full use of the stratification properties of the axes and cross-axes *milieu*, illustrated by the Ansoff matrix; and stage IV, which witnessed the hyper-specialized matrix. The latter stage reflects a kind of hypertely, which Simond described in these words (1958: 61):

The evolution of technical objects can move towards some form of hypertely, resulting in a technical object becoming overly specialized and ill-adapted to even the slightest change in operating or manufacturing needs and requirements;

*(iv) Tracing the genesis of the strategy matrix through a process of individuation.*

Our archival research, which was limited to literature produced in France between the years 1960 and 1971, showed that different iterations of the same technical object—the strategy matrix—emerged over the years, while presenting highly variable degrees of concretization. By classifying the objects according to their degree of concretization, we obtain a picture of the technical genesis of the matrix. The fact that only the most technologically evolved version, the type III matrix, is still in use in its original form, suggests that the genesis of the strategy matrix was a form of technical progress.

However that may be, given the extremely local nature of the findings, their validity and relevancy remain problematic.

### ***1.3 Cross-cultural validity and relevancy of the technical genesis of strategy matrixes***

We looked at a recent worldwide sample of strategy matrixes produced in academia (see chart in Appendix 7 and figures in Appendix 8). Such matrixes continue to be

produced throughout the world and, in reviewing them, it is easy to immediately identify four common stages of individuation of the object-matrix (see the “technical status” column in the chart). A review of the sample prompts the following remarks :

- (1) The “strategy matrix” technical object is used in a wide variety of geographical locations and specialized contexts (the Anglo-American and Hispanic worlds, and in India, etc.), but there is no technical stage that seems to be country- or context-specific. Although the production of strategy matrixes can be associated with a certain “technical culture,” it transcends the expected cultural divisions.
- (2) Stage III of the diagonal matrix is the most widely used and reproduced, which gives credence to the idea that it is the most “concrete” stage, offering the most flexibility, and represents an advance in relation to stages I and II.
- (3) The long-standing production of Stage I matrixes is noteworthy. This phenomenon was described and explained by Simondon himself with regard to “material” technical objects (Simondon, 1958).
- (4) Each stage IV hyper-specialized matrix exhibits a singular and distinct architecture, without having benefitted from any substantial re-use or generalization. Here, the Simondonian concept of hypertely seems to apply to these matrices as a whole.

We did not, however, find any studies that attempted, as we have here, to give a careful consideration of why and how a strategy matrix came to be designed, yet alone attempt to explain how choices were made regarding its structure, its components and their interactions, synergies and/or incompatibilities. Although strategy matrixes appears to have thrived over a long period of time, no “mechanology” (Simondon, 1958 : 81) of them as technical objects seems to have been developed or been taken into account by the authors. It would seem that the question of outlining a framework for



describing and teaching about the technical culture of matrixes remains to be investigated (Simondon, 1958 : 288).

## **2. Theoretical Discussion: the transindividual and laying the ground for a technical culture to come.**

Simondon's argument that the essence of the technical object resides in the scheme of the system in which it exists and not in its matter or form (1958, p. 6) opens the way for two complementary avenues of research for management sciences. The first consists of developing an approach for examining all kinds of abstract management tools as technical objects. That is what we just illustrated in considering the strategy matrix and its various iterations. In the invention of a strategy matrix, the generation of a diagonal and dynamic milieu offers a clear illustration of the Simondonian process where (Simondon, 1958, p. 71):

The unity of the future associated milieu (where cause-and-effect relationships will be deployed to allow the new technical object to function), is represented, acted out, like a role that is not based on any real character, but is played out by the schemes of the creative imagination.

The only thing that separates this case from Simondon's studies on mechanical and electronic devices of his day is that, here, "schemes of the creative imagination" and the scheme of the technical object both exist in a cognitive state.

A second possibility presented by this conception of the technical-object-as-a-scheme resides in the opportunity to develop a technical culture.

It goes without saying that an encyclopedic, manual-like overview cannot begin to provide a real understanding of management tools in all their strengths and limitations. Conversely, reading pointed case studies or sharing professional experiences (even those put down in text form) cannot give sufficient insight for fully understanding

the importance of choosing the right technical tool from among the wide range of existing models, let alone from among those that remain to be created. It would seem that the “general technology or mechanology” that Simondon had hoped for (1958, p. 58) holds out the possibility of providing management sciences with novel responses to this question. We shall now attempt to advance that argument while relying on the findings of our study of the “strategy matrix” as technical object.

Developing a true technical culture through strategy matrixes would, in our view, accomplish the ideal described by Simondon (1958, p. 335):

Above the social community of work, and beyond the interindividual relationship that does not arise from the actual performance of an activity, there is a mental and practical universe where technicity emerges, where human beings communicate through what they invent.

This presupposes, above all, that, between the specialist, the instructor and the student, “the technical object be taken for what it is at essence, that is, the technical object as invented, thought out, willed, and assumed by a human subject ” (ibid.) Insofar as the essence of technicity resides in the concretization of a scheme of individuation, developing a technical culture of management things more on the transmission of their genesis than on the transmission of their history alone. Specifically, transmitting a technical culture of the strategy-matrix object would entail explicating the synergetic functioning of its components and the degree of technicity involved in each of its different iterations, so that the student or the manager is able to invent or perfect his own matrixes, while remaining fully aware of the specific cognitive effects he wishes to impart with this tool and each of its variants. In that way, a relationship can be formed with the technical object by “creating a fruitful connection between the inventive and organizing capacities of several subjects” (ibid., p. 342). With matrixes, that would mean teaching learners and users to create a more or less successful synergetic interaction

between the functions of compressing, totalizing, linking and stratification, as defined above (§1.2).

Simondon (1958, p. 335) defines the relationship that develops between inventors, users and humans as “transindividual” whenever a technical object is “appreciated and known for what is at its essence.” Some might rightfully wonder whether the usual educational approach to strategy matrices reflects such a transindividual relationship or whether, to the contrary, it fails to encourage sufficient consideration of the importance of symbolic machines of management, which risks turning future managers into a “proletarianized worker,” to borrow the expression coined by Stiegler (2004). We know only too well that it is indeed possible to work as a proletariat while still being “manipulators of symbols,” in the words of Robert Reich (1992).

Simondon posited the notion of transindividualism because, in his thinking, a human, like all living beings, is never definitively an individual: “the individual is neither complete nor substantial in itself” (2005, p. 216). Ever engaged in a necessarily incomplete process of individuation, he has at his core a “reservoir of becoming” and remains a pre-individual (2005 : 167). That enables a part of himself, which is identical to other humans, to fuse with a superior individuated entity. Here, Simondon is describing two separate things (2005: 167). On the one hand, there is an affective dimension, which we will not address here, but there is also a cognitive dimension, which consists of schemes or systems of thought. Put in more contemporary terms, while taking into account the rise of the cognitive sciences, it can be said that universality and our subconscious cognitive faculties represent the pre-individual reservoir of each human being, whereas the universal understanding of technical schemes among highly dissimilar people is a decidedly transindividual act, which occurs when human beings,

who are quite unlike, activate the same mental operations in a similar way. The Simondonian transindividual can, in this way, be seen as a core notion of a universal technical culture, which cuts across ethnic cultures and corporate cultures alike, provided that an understanding of the genesis or lineage of technology (notably, managerial techniques) is sufficiently developed. Hopefully, the reader of these lines is only too well aware that it is that very type of transindividual relationship that has begun to develop, here, between himself or herself and creators of strategy matrices.

### **3. Epistemological discussion: archeology and allagmatic operations**

In previous studies (author), we showed how the four above-mentioned operations (compressing, linking, totalizing and stratification) could be read through the lens of Michel Foucault's rules governing discursive formations (1969) and could be extended well beyond matrix models to cover all of the concepts generated by French strategists in the 1960s, encompassing a wide variety of technical elements. Performing such an "Archeology of Strategy-related Knowledge" revealed that the strategy-related data that we collected was stratified via cognitive tools such as matrices according to institutional positions adopted by executive management. In other words, the epistemological stratification of strategy-related data reproduced the hierarchical stratification of the firm. The utopia of an all-powerful, all-knowing executive management was, in a certain manner, created by the very structure of the strategic concepts (Author).

The obvious limitations of an archeological approach are that it merely allows us to identify constants in the structure and the structuration of concepts, and uncover blind

spots in concept formation. It must be remembered, too, that archeology is archeology, which means it focuses on particular historical moments, seeking to regroup conceptual tools under the same banner without classifying them in relation to each other, or on the basis of their lineage or forms of succession. In contrast, by viewing cognitive tools not only as concepts but as technical objects, after Simondon's example, it is possible to identify their genesis and make a cross comparison according to their degree of technicity. The Simondonian notion of *concretization* is intended, here, to complement the Foucauldian rules of discursive formation (Foucault, 1969).

That idea can be developed even further. We need merely consider that Foucauldian archeology, far from being solely a form of structuralism--which Foucault repeatedly denied to no avail--constitutes what Gilbert Simondon termed an allagmatic operation or a "science of operations." The operation-based dimension of Foucauldian archeology becomes clear, for example, through the schemes and systems that Foucault suggested be employed to identify the rules of concept formation in any given corpus of knowledge (although that must be seen as only a preliminary step). Below, we present an outline of Foucault's procedures of intervention in relation to discursive statements (1969 : 78):

Foucault's procedures of intervention (1969)	Operations performed through the "strategy matrix" considered as a technical object"
Techniques of rewriting	Redistribution of a model into a two-dimensional type model
Methods of transcribing according to a more or less formalized and artificial language	Assigning a name to each strategy (e.g. "concentric diversification")
Methods of translating quantitative statements into qualitative formulations, and vice-versa	Place categories on a continuum on each axis
Methods of expanding approximations of statements and refining their exactitude	Make a transition from discrete categories to continuous gradients
The way in which the domain of validity of statements is delimited, again through a process of expansion and refinement	
The way in which a type of statement is	

transferred from one field of application to another	
The methods of systematizing propositions that already exist, insofar as they were previously formulated, but in a separate state	Include pre-designated strategies (organic growth, diversification) in an over-arching system as potential outcomes or courses of action.
Methods of rearranging statements that are already related or linked to each other but have been recombined or redistributed into a new system	Stratify the scope of possibilities within the block or partition of the matrix denoted as <i>milieu</i> .

Table2: Foucault’s procedures of intervention and operations performed by type III strategy matrixes.

By their very wording, these “rules of concept formation” reveal exactly how they operate. “Transcribing,” “translating,” “redistributing” (or “rearranging”), etc. are as much cognitive operations as discursive practices. Even if Foucauldian archeology does not draw explicitly on Simondon terminology, it undeniably establishes an *anexus* between operation and structure. Written by Michel Foucault as a work of theory, but also as a defense and illustration of the approach he had adopted in his previous works (Foucault, 1961, 1962, 1966) at the height of the structuralist vogue, *The Archeology of Knowledge* seems almost to be out to confirm Simondon’s assertion that “a science of operations cannot be achieved unless the science of structures senses, from within, the limits of its own domain” (2005: 531). Simondon uses the term “*allagmatic*” to describe the “theory of operations” (2005, p. 529). Our study of matrixes seeks to illustrate the intimate links that bind operation and structure, but in light of the conceptual groundwork laid out by Simondon.

In Simondon’s view, an operation “precedes and leads up to the appearance of a structure or modifies it” (ibid., p. 529). He provides a simple illustration by describing the gesture made by a surveyor who traces a line parallel to a straight line through a point lying outside that straight line. The surveyor’s act is structured on “the parallelism

that exists between a straight line in relation to another straight line,” whereas the operation behind that act is “the gesture through which he performs the tracing without really taking much notice to what it is he is tracing.” The important thing here is that the operation, the “gesture,” has its own schema of how it is to be carried out. Indeed, to trace a straight line, a whole series of turns of the wrist and movements of the arm, for example, are called into play. The operation entailed in tracing a straight line requires adopting an array of angular positions, in contrast to the parallel lines themselves that will result from the act of tracing. The scheme of the operation (a variation of angles) is thus by no means an exact reflection of the scheme of the structure (strict alignment) needed to carry out the operation itself. Similarly, it can be said that the operations performed by a matrix (dynamic stratification, oriented gradient) do not reflect the static, symmetric, and isotropic schema that underlies the structural framework of each matrix box.

Simondon posits concepts defining the relationship between structure, operation and the individual. Referring to paradigms found in the field of physical chemistry and information theory (ibid. p. 536), he defines *modulation* and *demodulation* as two possible ways of linking an operation and a structure (ibid: 531). “Modulation is the act of bringing together operation and structure into an active ensemble called the modulator” and the act of demodulation is the exact opposite: separation. Each individual is, for Simondon “a domain of reciprocal convertibility of operation into structure and structure into operation,” i.e. “the *milieu* of the allagmatic act” (p. 535). An individual can inhabit two possible states. The first is the so-called “syncretic” state of the individual engaged in the process of individuation, where operation and structure are still fused and indistinguishable; and the lack of distinguishability is the nature of this metastable situation: “the individual is fraught with

tension, oversaturation, incompatibility. ” (p. 535). That same individual sometimes enters another so-called “analytic” state, in which structure and operation exist correlatively, and the individual becomes individuated.

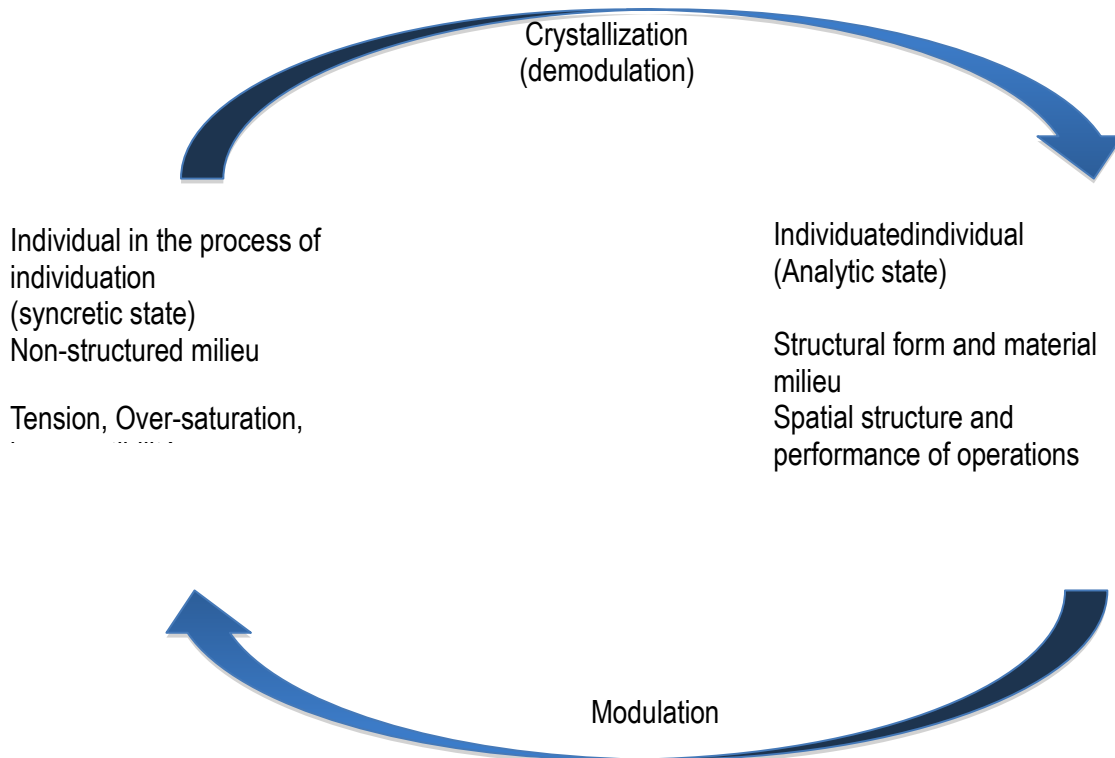


Figure 3: Conversion actions between operation’ and ‘structure,’ based on Simondon’s concepts (2005: 535-536).

The applicability of these concepts to strategy matrixes is obvious. Executive Management is ever confronted by concerns that are syncretic, super-saturated and contradictory, and there is a constant need to refine and summarize strategy-related data and link it intelligibly. The inventor of a strategy matrix *crystallizes* this field of tensions into a two-dimensional structure that aims to classify, rank, interpolate and stratify it, while offering a metastable solution to any incompatibilities and conflicting expectations. The “type III strategy matrix” a technological individual performs



these *operations* through a structure with oriented and graduated orthogonal axes, and the two-dimensional stratified milieu that emerges.

Management teams that compile strategy-related data and input it into the matrix blocks *modulate* the data. The result of that operation is, if successful, a *syncretic* strategic vision. Here, the matrix has played a role that Simondon calls “Form-signal.” As for the management researcher, he also engages in a type of conversion action. For him, these conversion actions are neither modulation or demodulation but “analogy,” in the full sense of the term as used by Simondon. Modulation and demodulation link operation and structure, whereas analogy links two operations with each other. This is why Simondon calls an analogy an “*équivalence transopératoire*” (ibid., p. 531). Specifically, when the researcher or the instructor explicates the genesis of the strategy-matrix-as-technical-object, he or she creates a useful link between the inventor’s crystallization of the matrix, on the one hand, and, the crystallization that consists in the reader’s understanding of that very same schema, thanks to the information storage and schematizing machine that is his brain, on the other hand. That process is made possible by the fact that we share the same faculties of intelligence, which are a part of our common transindividuality. In Simondon words, “It is human understanding of, and knowledge about, the same operative schemas that human thought transfers” (2005 : 533). In an analogical operation, Simondonian epistemology is superimposed onto the ontology. And let us end with a salient quote from the Simondonian philosopher Jean-Hugues Barthélémy (2014: 27):

In contemplating all things in terms of their genesis, human thought participates in the construction of its own thinking, instead of confronting it directly, because “understanding” genesis is itself still a genesis followed by understanding.

## Conclusion

This paper seeks, first and foremost, to make a unique theoretical contribution to management science: we have developed a transcultural theory on the essence of strategy matrixes and their technological genesis. We have also sought to draw attention to significant methodological issues by testing and validating a study of cognitive management tools, principally by drawing parallels with Simondonian concepts regarding electronic and mechanical technical objects from the 1950s. In addition, our contribution may be seen as having a number of implications for epistemology: we have highlighted the important structuralist, as opposed to structuralist, workings behind Foucauldian archeology. By studying the rules of concept formation that apply to management science, seen as a field of knowledge, we have sought to examine strategic management tools and concepts through an allagmatic perspective, viewing them as technical objects. Lastly, our research can have interesting repercussions for education, for we have outlined an educational approach to examining the technological culture of management based upon building a link between the transindividual and those who create management systems.

The controversies that have arisen pitting individualism against holism, universalism against culturalism, the structure against dynamism, and being against nothingness, are a reflection of the great, perplexing difficulties that continue to haunt Western thought.

With Simondon, the notion of genesis is given pride of place, mainly because it alone “presupposes the unity containing plurality” (2005: 266), and is seen as a *solver of aporia*. The fact that a human being is engaged in a continuous genesis of itself is also a fundamental principle behind Simondon’s concept of the transindividual. The allagmatic (2005 : 429), which seeks to grasp the relationship between operations and

structure, opens the way for resolving other incompatibilities. We hope that, in elaborating these topics in the context of specific management objects, our findings will incite the academic community to someday devise a true technical culture of management. And although that day may prove to be a long way off, we can only hope that Simondon's wish, expressed in 1958, will ultimately be realized (p. 298):

Through the generalization of the fundamental 'schemas', a 'technic of all techniques' could be developed: just as pure sciences have sets of precepts and rules to be followed, we might imagine creating a pure technology or a general technology.

1. "The living being is an individual who carries within himself his associated milieu"  
(Simondon, 1958, p. 71)

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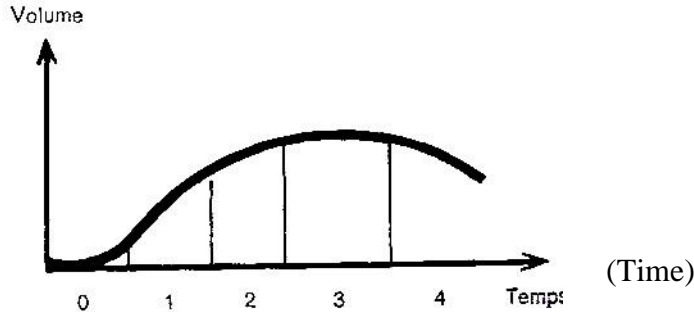
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## Appendix 1: the “Sadoc/ G linier Matrix”

G linier (1963, pp. 158-169) designed a matrix portraying the correlation between certain types of situations and appropriate strategic responses, containing 8-variable values. It makes cross-tabulations between variables, but only for variables 1 and 2, through “Sadoc’s Table of Ongoing Adaptation to Market Changes,” making it the first strategy-related matrix produced in the French-speaking business community. The two variables are “Product Age,” which is represented in classic terms as segments of a product life cycle curve (see fig. X below); and the “Type of Market Competition,” which can assume one of four values: A = Perfect competition, B = Oligopoly (undifferentiated products), C = Monopolistic competition (oligopoly between differentiated products), D = Temporary monopolies, and E = Permanent Monopoly.



(Ty Figure 4. G linier / Sadoc’s product lifecycle curve

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		Phases de vie du produit				
		0	1	2	3	4
Type de concurrence	A					
	B					
	C					
	D					
	E					

(Product Life Cycle Phases)

Figure 5. G linier/Sadoc’s matrix.

The underlying idea behind this matrix is that a firm whose product x competition outcome is unfavorable (typically illustrated by G linier in box A4, showing a product in decline stage in a context of intense competition) must change its product focus toward a mix that is more favorable (the arrow drawn by G linier points to box C2, indicating a product in the growth stage on a niche market). The product adaptation process is “ongoing” whenever the firm engages in a variety of business activities, where certain ones, as indicated in the upper right-hand section of the matrix, will have to undergo adaptation. The need to implement business changes came as part of a national industrial restructuring effort in the postwar period, after CECA and, later, the Common Market raised the possibility of “converting marginal businesses.”

This chart can be viewed as a combination of two technical elements (graduated axes) located within a *milieu* (demarcated by space on the sheet of paper) that allows them to interact. Each segmented axis projects into the space all available options (i.e. all products or competitive situations falling within one of the types of pre-defined categories). It should be noted that the products axis is not only segmented but graduated as well, since the order of the segments reflects the law of the changing market reality, in contrast with the axis depicting competitive situations. At the same time, the space occupied by the matrix portrays 25 types of strategic situations, reducing the memorizing effort required to interpret the axes and their graduation. Hence, the matrix performs both a totalizing and compressing function. However, there is no clear, explicit method for linking the elements that explain the overall logic of adapting to market changes: financial synergy, the cash flow rationale, and the technology trajectory. In this pioneering technical object, which closely resembles the matrix designed by Arthur D. Little, the underlying portfolio assumptions are confined to a risk minimization strategy, at best. Structurally, there is no clear means of locating the *milieu* or zone of interaction between the two matrix axes; that is, there is no diagonal line created by the interaction of the different characteristics on each matrix axis.



## Appendix 2: The “Panther/Elephant” matrix

A new management approach is beginning to appear on the horizon and is poised to challenge if not surpass the traditional “best management practices” spirit. For it is becoming increasingly clear that the quality of business management is no longer enough to guarantee success, as managers find themselves faced by an emerging breed of “flexible, fearless, but highly successful and visionary entrepreneurs.”

Claude Charmont has proposed a model relying on all of these assumptions, giving it a form that represents one of the first and most highly original uses of strategy matrixes.

It classifies firms according to their business outlook within a two-dimensional array (“square matrix”), with the first variable representing the degree of “best-practice spirit,” and the second measuring the degree of “entrepreneurial spirit.”

A translation of The Charmont matrix is shown below:

		Entrepreneurial Spirit	
		Weak	Strong
Best management practices” spirit	Strong	3. Conservative, well-managed firms	4. Firms enjoying fast-growing diversification but selective in exploring new avenues to profits
	Weak	1. Bureaucratic and conservative firms	2. Dynamic, forward-moving firms characterized by a high number of failed ventures

Fig. 6. The Panther/elephant Matrix

New entrepreneurs or “panthers” are placed in category 4, and the best traditional firms or “elephants” occupy category 3. For ease of understanding these two categories, American firms are presented as examples (General Motors, being an elephant, and Xerox a panther).

The panther/elephant matrix is, undoubtedly, the most rudimentary version of the technical object to emerge between 1960 and 1970. Indeed, the matrix axes are rather

unsophisticated, acting merely to totalize data by breaking down firms into segments according to binary values. Although values are mapped as strong/weak, the lack of intermediate values, as well as the absence of any defined logic behind the transition between segments, means that it is not possible to indicate graduated variations. The model remains wholly classificatory, with a weak totalizing function (factor 2: memorization of 4 quadrants is reduced to the memorization of two axes). No diagonal effect is produced by combining axes, and there appears to be no means of circulating within the two-dimensional space, so that the matrix does not generate its own *milieu*.

### Appendix 3. Ansoff's diversification matrix

In a work that has been translated into French, Ansoff (1970, chap. 7) lays out his thoughts on diversification strategies, using a matrix that exhibits a high degree of technicity.

		NOUVEAUX PRODUITS	
		De technologie connexe	De technologie différente
NOUVELLES MISSIONS	Produits		
	Clientèle		
	Du même type	<i>Diversification horizontale</i>	
	De la firme elle-même	<i>Intégration verticale</i>	
	D'un type similaire	(1) *	(2) *
	D'un type nouveau	(3) *	<i>Diversification hétérogène (conglomérat)</i>

- \* (1) Distribution et technologie connexes.
- \* (2) Distribution connexe
- \* (3) Technologie connexe

FIGURE 7-2. — Vecteurs de croissance dans la diversification.

		New Products	
New Targets or Business	Horizons	Products	Related Technology
		Clients	Unrelated (Different) Technology
		Same Type	Horizontal Diversification
		Of the firm itself	Vertical Integration
	Similar Type	Concentric Diversification	

	New Type		Conglomerate (Heterogeneous) Diversification
--	----------	--	--

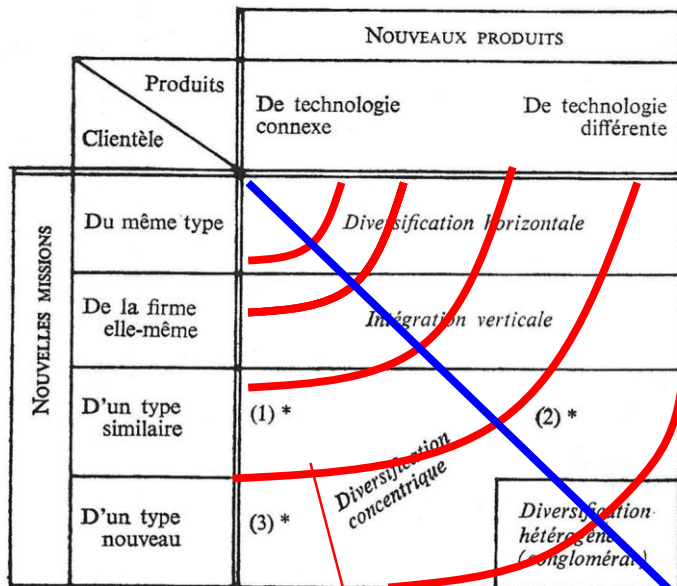
(1) Related marketing efforts/systems and technology.

(2) Related marketing efforts/systems

(3) Related technology

Fig.7. TheAnsoff Diversification matrix (below : a re-transcription in English of the French document)

As the term “concentric diversification” suggests, the matrix space displays a diagonal gradient in the upper left-hand corner, which represents the point where products/clients are the least different from those involved in the firm’s current business activity; and the lower right-hand corner represents the furthest distance point, where the differences are greatest. Aside from the totalizing effect produced by the segmentation of each axis, the matrix produces a compressing or reducing effect that is far greater than in other versions of the matrix-as-technical-object: the concentric diversification quadrant is a space offering a wide variety of nuanced combinations, which is, nonetheless, generated by axes requiring very little memorization. It should be noted that the horizontal axis portraying new products is not actually segmented but, rather, is bounded between poles at each extremes (related product technology and different product technology), which allows endless shades of intermediate values. In this matrix, the vertical axis condenses the categorizing function (with values describing all possible situations)and offers a hierarchical/ranking order function (the axis is oriented), while setting out a gradient of values. And, thanks to the continuous graduation on the horizontal axis, the possibilities are endless for interpolating intermediate categories between each product-technology category. The two-dimensional matrix space has become over saturated, displaying a correlative diagonal gradient of lines at an iso-distance from the firm’s current situation, and showing a “concentricity” of options.



- \* (1) Distribution et technologie connexes.
- \* (2) Distribution connexe
- \* (3) Technologie connexe

FIGURE 7-2. — Vecteurs de croissance dans la diversification.

Lines at an iso-distance from the firm's current situation

Normal reading orientation (in the direction of the slope of the diagonal line)

Figure 8. Stratified milieu within the Ansoff diversification matrix

However, it should be noted that, unlike matrixes from the 1970s (BCG, ADL and McKinsey), the diversifications matrix is not a portfolio matrix strictly speaking. There is no pattern of linkage between the different cells of the matrix to create a synergy between the different modes of diversification that are presented. Matrixes from the 1970s also pursue objectives that are the exact opposite of those that the Ansoff attempts to portray: paring down portfolios of industrial conglomerates whose activities have grown too unwieldy and have become unprofitable.

## Appendix 4: Morphological matrixes and “morphological boxes”

In *Prévision à long terme et stratégie*, Christophe Dupont (1970) attempts to establish a link between technology planning and strategic management. He presents two analytical tools that seem to have played a primordial role in the genesis of matrixes: the “morphological box” and “morphological territory.”

The “morphological box” is a technology forecasting and planning tool that is still used, to this day, in France (Godet, 1997), for all kinds of forward-looking studies.

Every possible configuration is represented by an n-tuple $[P_{ij}]$ , with a combination of values using a set of descriptive parameters indicating possible future scenarios or situations (following the example given in Dupont’s book, we have shown variables in sextuples). Some parameters have fewer possible alternatives than others, and “prohibited” scenarios are indicated with an “X.”

(Lines : Descriptive Parameters)

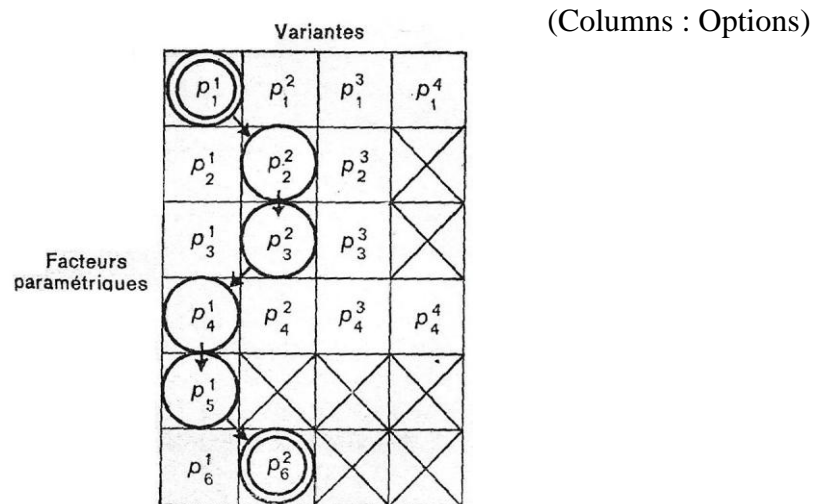


Fig. 9 The morphological boxes

The author then introduces the notion of the difference, or distance, between the possible scenarios (in the same way that the distance between vectors is calculated in mathematics), which leads to the definition of “morphological territories,” that is, concentric zones in which future situations are shown at a further and further remove from the current situation:

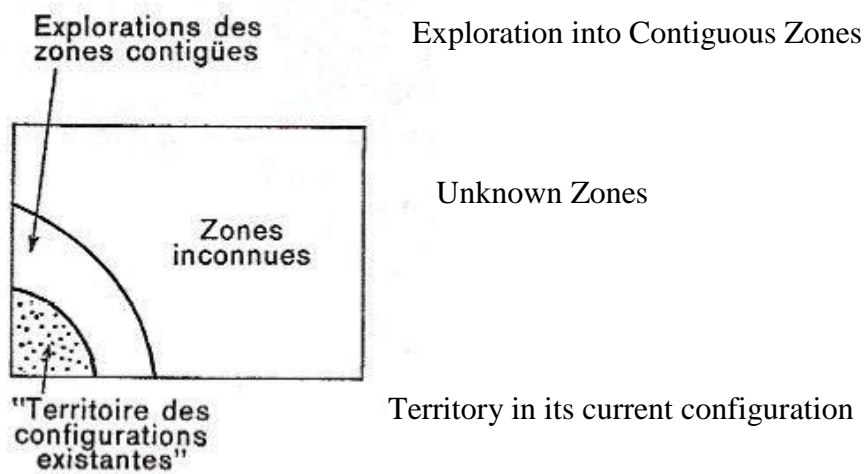


FIG. 10 a. — « Territoire morphologique ».

Fig. 10 The morphological territories

Elsewhere, the author uses two different models to perform operations using much more technically sophisticated matrixes.

On the one hand, an open-ended, non-totalizing categorizing function is performed using the open-choice combination feature offered by the morphological box. From one scenario to the next, an intelligible link is created by alternating between different cells of the morphological box situated on the same line. On the other hand, a reducing effect and ranking function operate between the scenarios through the morphological territory, which encompasses all of the possible scenarios in a quadrangular cell where a metric function can be used to measure the distance from the firm’s current situation, which is suggested implicitly by a diagonal line. This tool also converts the discontinuous alternation of the prospective scenarios (which is discrete, in the mathematical sense of

the term) into a continuum of options defined by their distance from the current situation, portrayed as concentric circles dubbed “contiguous zones.”

From a functional point of view, the Ansoff matrix can be considered simply as a condensation, into a single object, of elements that appear in the morphological box and morphological territory model. Taking two more ungainly tools and combining them into a single, more “concretized” tool that is technically more sophisticated, is analogous to the laboratory machines whose fit is not yet optimal, as described by Simondon to illustrate the pre-individual stages that mark the genesis of a technical object.



## Appendix 5: The Houssiaux Matrix (Houssiaux, 1970)

Although it is not designated a strategy matrix, this model warrants inclusion in the study sample. For it evaluates multinational strategies that firms should adopt, based on the consistency of the industrial policies enacted by State governments in countries where they do business or plan to do business.

The model operates in a three-part process:

1°) Using a two-dimensional layout ("Chart I"), it portrays the policies to be adopted by multinational firms by reference to the industrial policies enacted by the State government in country A and in country B, respectively. It can be said to have a canonical form insofar as it generates a set of options for the highest number of policy configurations already in place, which are then subdivided into subsets according to specific variables relating to a particular industrial policy:

		PAYS B			
		Politiques industrielles (B) vis à vis des entreprises multinationales			
		1	2	3	4
PAYS A	1	P0 nombres firmes multinationales Gestion uniforme	Sym 1-2 Sym 1-2 P1 Gestion uniforme avec les cantons et participat. locale	Sym 1-3 Sym 1-3 P2 Polycentrisme	coût de résolution des conflits maxim Probabilité élevée de non solution Retrait de B
	2	coûts faibles Probabilité de non solution faible P1 Sym 2-1	P1 P1 politiques identiques supplémentaires pour Geo	Sym 2-3 Sym 2-3 Polycentrisme	Sym 2-4 Sym 2-4 C2
	3	coûts moyens Probabilité de non solution moyenne P2 Polycentrisme	coûts faibles Probabilité de non solution faible Polycentrisme	pas de coûts résolution des conflits Polycentrisme	Sym 3-4 Sym 3-4 C1
	4	coût de résolution des conflits maxim. Probabilité élevée de non solution Retrait de A	coûts moyens Probabilité de non solution moyenne C2	coûts faibles Probabilité de non solution faible C1	peu de firmes multinationales C0

→ difficultés croissantes pour les entreprises multinationales dans l'environnement B  
 ↓ indépendance totale des filiales  
 ↓ difficultés croissantes pour les entreprises multinationales dans l'environnement A

C0, C1, C2 ..... Isoligne des coûts de résolution des conflits  
 P0, P1, P2 ..... Isoligne de la probabilité de non solution des conflits

		COUNTRY B						
		Industrial policies adopted by (B) with respect to multinational firms						
<b>COUNTRY A</b>	<b>Industrial policies adopted by (A) with respect to multinational firms</b>	1	No. of multinational firms  Uniform management policy	Sym 1-2 Sym 1-2  Uniform management with cantons/townships and localities	Sym 1-3 Sym 1-3  Polycentric orientation	Maximum Cost of Conflict Resolution  High probability of non-resolution  Withdrawal from B	<b>Subsidiaries enjoy full Independence</b>	<b>Increasingly Difficult for multinational firms to do business in environment A</b>
		2	Low costs  Weak probability of non-resolution  Sym 2-1	Geocentric orientation	Sym 2-3 Sym 2-3  Polycentric orientation	Sym 2-4 Sym 2-4		
		3	Medium-level costs  Medium-level probability of non-resolution  Polycentric orientation	Low Costs  Low probability of non-resolution  Polycentric orientation	Polycentric orientation  Polycentric orientation	Sym 3-4 Sym 3-4		
		4	Maximum cost of conflict resolution  High probability of non-resolution  Withdrawal from A	Medium-level costs  Medium-level probability of non-resolution  Subsidiaries enjoy full independence	Low Costs  Low probability of non-resolution	Few international firms		

**Increasingly Difficult for multinational firms to do business in environment B**

**C0, C1, C2 ....Iso-line showing costs of conflict resolution**

**P0, P1, P2 ... Iso-line of probability of non-resolution of conflicts**

Fig. 11 The Houssiaux Matrix (Below : translation of the matrix terms and legend)

The farther you move away from the upper left-hand corner of the chart, the industrial policies become generally unfavorable. The farther you move from the main diagonal, the greater the disparity between the industrial policies in countries A and B. Using values gained from the two “construct” variables in the chart, Houssiaux classifies the situations into two categories according to divergence and degree of severity. Hence, there are a certain number of cells covering the same category. For each disparity/severity category there is a specific, corresponding multinational policy, as is shown in Chart n°3:

TABLEAU III  
Type des stratégies suivant les divergences entre politiques industrielles

LISTE DES SITUATIONS	TYPE D'ORGANISATION RETENUE
1 - 1 2 - 1, 2 - 2, 1 - 2	— gestion uniforme ; centralisation ; <i>ethnocentrisme</i> , — gestion uniforme avec exception ; centralisation avec réseaux d'information : <i>géocentrisme</i> ; direction centrale cosmopolite,
1 - 3, 2 - 3, 3 - 3, 3 - 2, 3 - 1	— gestion décentralisée avec information et sous-contrôle des résultats ; <i>polycentrisme</i> ; faible importance du centre de décision multinationale qui est cosmopolite,
1 - 4, 2 - 4, 3 - 4, 4 - 4, 4 - 3, 4 - 2 et 4 - 1	— peu d'entreprises multinationales ; <i>indépendance totale des filiales</i> ; absence d'un centre multinational de contrôle ; développement des <i>intérêts minoritaires et des associations</i> .

**Type of strategy adopted depending on disparities between industrial policies**

Strategies in light of disparities in industrial Policies			
List of Situations	Types of Management organization		
	--uniform management; centralization; ethnocentric orientation --uniform management with exceptions; centralization with information network; geocentric orientation; central cosmopolitan management --decentralized management with information and sub-control of results; polycentric orientation; multinational decision-making center takes on less importance because it is cosmopolitan,  --few multinational firms; subsidiaries enjoy full importance; absence of a multinational control center; development of minority interests and associations		

Fig. 12. The Houssiaux Type Strategies (Below : translation)

It should be noted that interpreting the policy recommendation is relatively straightforward: the multinational firm should adopt a less-integrated business model as the degree of divergence between the national policies rises.

J. Houssiaux's chart is canonical but is not a "matrix" strictly speaking. In a true matrix, two different parameters are represented in each matrix cell in order to show a unique and unrepeated combination of values. Here, to the contrary, the model repeats a value ("severity" of state policies), placing it in two different blocks on either side of the main diagonal line. That explains why the chart is perfectly symmetrical, forming a rectangle that has been cut into two congruent triangles, with the same value in both the upper and lower halves. A single triangle, using either the upper or lower half of the chart, would have sufficed for presenting all of the information shown here. And so, not only is this not the most optimal use of space, it illustrates a very poor use of the compressing effect.

Nonetheless, the graduated axes of the matrix generate, a diagonal slope. Similarly, the fact that the full range of possible industrial policy options is covered by each axis performs a good totalizing function.

## Appendix 6: The *Bijon* matrix

The author laid out a theory of making the right strategic choice, based on the perceived growth potential of the firm and its markets, respectively. The model shows a “two-dimensional space” divided into six sectors, and requires a minimum of mathematical proficiency if it is to be used to good effect.

To construct this type of “matrix,” the author defines three values, the third of which proves more difficult to express as a testable value than the first two:

- “The market growth rate ( $tm$ )” If the firm is highly diversified “a different approach may have to be adopted, separately, for each of the firm’s business units” (p. 224)

“The ‘reasonable’ growth rate ( $te$ ) is the highest growth rate that the firm can allow itself to achieve without making a structural change to its balance sheet ”

It is a “function of its cash-flow, its ability to negotiate borrowings on financial markets, and make sensible income-producing investments” (p. 224).

- The firm’s position (or the position of a diversified firm’s business unit) is shown on these three parameters in a plane ( $te/tr$ ) x ( $te/tm$ ).

Depending on whether or not the firm grows faster than the market where it operates, it will occupy one or the other side of the diagonal on this plane:

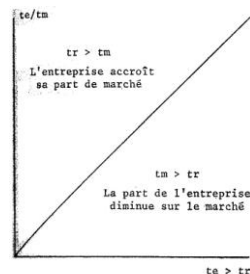


Figure 1. — Taux de croissance de l'entreprise comparé à celui du marché.

The firm increases its market share  
The firm’s market share decreases

Figure 1. The firm's growth rate compared to the market growth rate

Fig. 13 The first segmentation within The Bijon Matrix (terms translated under the schema)

Likewise, depending on whether or not the firm's growth ( $tr$ ) exceeds its financial capacity ( $te$ ), it will position itself to the left or to the right of the median line ( $te/tr = 1$ ):

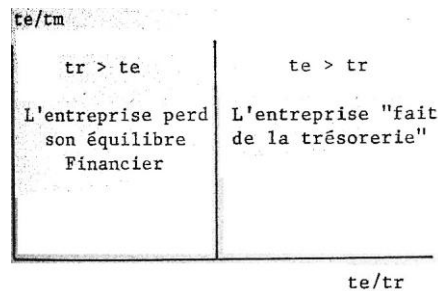


Figure 2. — Taux de croissance de l'entreprise comparé à ses possibilités financières.

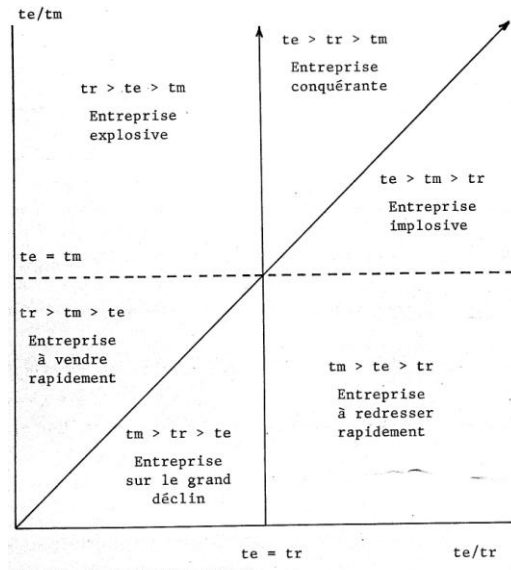
Translation:

The firm loses its financial equilibrium

The firm improves its cash flow

Fig. 14 The second segmentation within The Bijon Matrix

By combining these two sides of the plane, Bijon obtains an even more precise interpretation of the value pair ( $te/tr$ ,  $te/tm$ ):



Translation :

A booming firm

An industry leader firm

A failing firm

A firm that should be quickly put up for sale

A firm in major decline

A firm in need of a quick turnaround

Figure 3. The six possible mismatch situations

Fig. 15. The complete Bijon matrix

The most favorable situation for the firm is that of “industry leader” shown in quadrant  $te > tr > tm$ .

**That situation can deteriorate toward either of two directions**, each of which is linked to a specific type of management error: a) a “myopic view of the environment,” in which a firm that is growing slower than the market experiences a dramatic loss in its growth capacity (a scenario depicted in the area below the main diagonal) and b) “disregard of financial imperatives,” where a growth crisis also places the firm in a difficult financial situation. In this approach, the path taken by a firm can be seen in the model (Bijon did not create the model used for this paper):

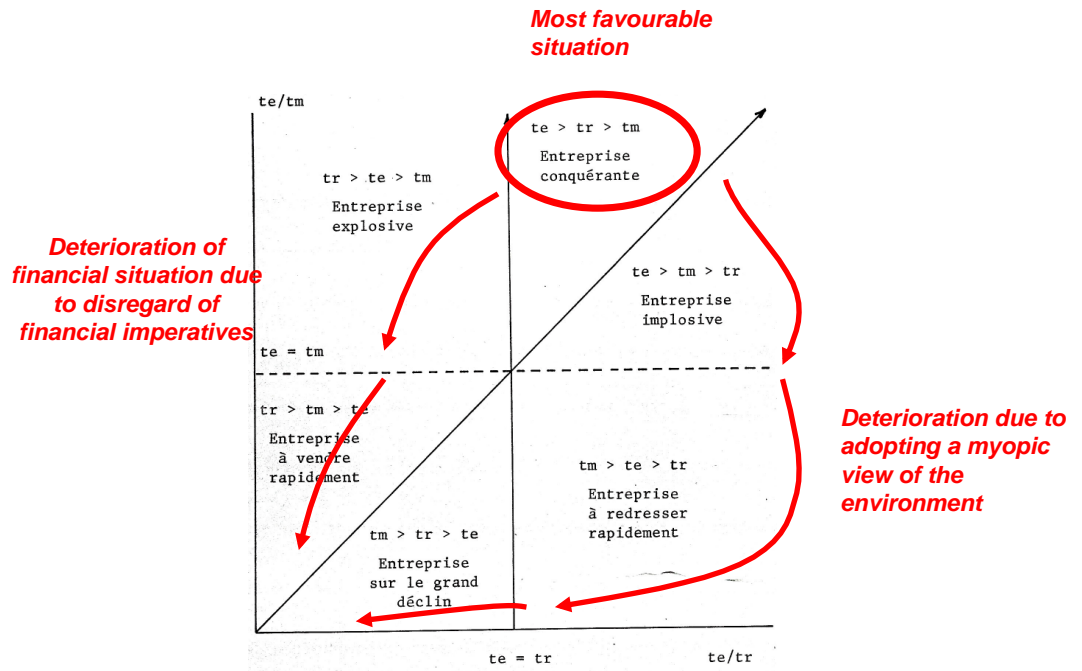


Fig. 16. Strategic trends awkwardly suggested by the Bijon matrix

Bijon concludes by describing the conditions for profitable diversification, for every business; “Aside from the case of the industry leader ( $te > tr > tm$ ), diversification is difficult to achieve unless the firm monitors results and the external environment, while remaining prepared to take corrective action as the situation warrants.” (p. 226)

It is interesting to see how this strategy planning model and the BCG matrix compare. Although there are considerable differences in the parameters at play, as well as in the underlying commercial and economic factors, the outcomes obtained from using these models are likely to be scarcely different. .



Let us look, first, at the differences:

As regards the calculated values, the BCG matrix cross-tabulates industry growth rate factors and their relative market shares. These values may appear to be constructed solely from data visible from outside the firm/industry, independently of its financial structure, management, etc., whereas the Bijon matrix cross-tabulates growth rates in terms of the value ( $te$ ), which is clearly variable dependent on the firm's balance sheet structure.

The other differences (division of the matrix into 4 parts instead of 6, no express requirement to use a portfolio with the Bijon matrix) are minor by comparison to the difference mentioned above.

- There are also a number of important points that the models share in common:

For one thing, the planned or forecast values for both models are very similar. Indeed, in both cases, they create a diagonal effect within the matrix that naturally draws the eyes in the direction of its slope, to view the path taken by the firm.

In addition, when examining **the commercial and economic laws underlying both models, we recognize an even closer similarity**. On the one hand, the BCG matrix enjoys economic relevancy only because it bears out the law of the stages of industrial maturity, which itself is founded on an interpretation of the "experience curve": the more an industrial sector matures, the more a dominant market position in that particular sector is required in order to generate a cash flow from that sector. On the other hand, the Bijon model has a predictive value only if the "reasonable growth rate value ( $te$ ) is constantly updated, insofar as it measures a firm's capacity to supply capital that it has not applied toward its own growth. Although there is no explicit law of maturity justifying this model, the presence of the value ( $te$ ) ensures that it is, in fact,

taken into account, in the event that it indeed proves valid. The Bijonmodel rests on weaker assumptions than those inherent to the BCG model, and reveals itself to be more general in scope. It could be said, then, that the primary difference between the two tools is their difference in presentation: while the BCG matrix takes into account the firm's financial resources only implicitly, through the law requiring that a balanced portfolio be maintained, which guides the manner in which its results are interpreted, the Bijon matrix displays its internal features explicitly in the matrix coordinates. In contrast, the need "not to lag behind when entering the market" is, in the case of the Bijon model, implicitly presented through the reader's interpretation of the spatial arrangements and, in the case of the BCG, more explicitly in the form of one of the two values evaluated in the matrix: the relative market share.

There are two sections within a single 3-dimensional strategy decision model, based on the intersection of three continuous values: market growth, market share, and financial capacity for growth.

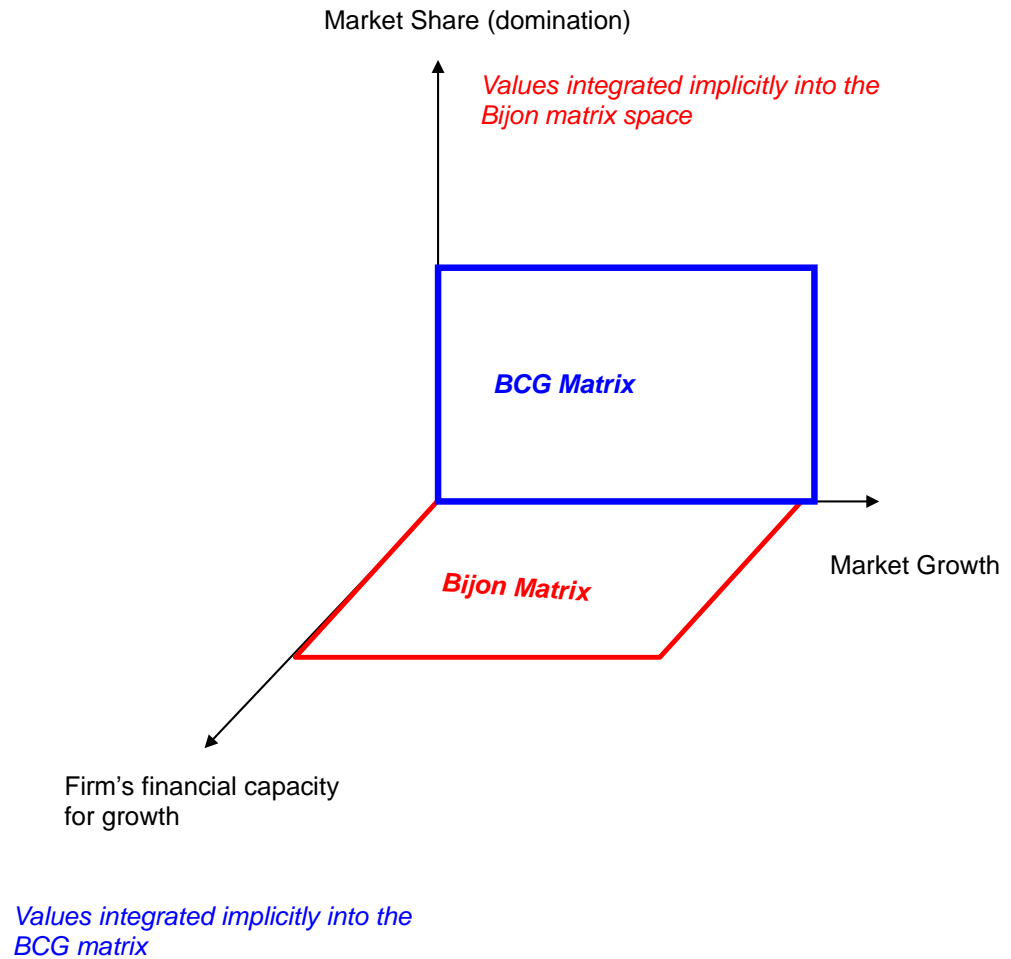


Fig. 17. The Bijon Matrix vs. The BCG Matrix

The birth of the BCG matrix, on the other side of the Atlantic, coincided approximately with Bijon's creation. When compared to the American model, however, it is apparent that the French variant introduced a number of important changes, which, in a way, is quite unfortunate, as caused the model to be overspecialized, and it inspired no offshoots.

## Appendix 7. “Technicity” of late and contemporary matrixes

Name and references	Axes	Technical status	Remarks
Relationship strategy Matrix (Mohammed Ilyas & al. 2007)	Alliance x Alliance factor	I	
Strategy Content Matrix (Boyne & Walker, 2004)	Strategic Attitude x Market-Products-Prices	I	
The “firm patent strategy matrix” (Hemphill, 2007).	Participation-non P. x Disclosure-non D.	I	
The “ICMA Strategy matrix” in (Banerjee, 2008)	Brand Heritage x Culture heritage	II	Axes have a gradient, but no diagonal gradient is generated among the quadrants
The “People-Strategy” Matrix (Azmi, 2008)	Ability x Willingness	II	A “skewed” Matrix. Axes have a gradient, but no diagonal gradient is generated among the quadrants
Unnamed Matrix (Ionescu & Turmei, 2011)	Market life cycle stage x Competitive position	II	An avatar of the Arthur D. Little Matrix, but with no exploitation of the diagonal gradients.
Innovation matrix (Sonfield & al. 2001). The same is used in (Sonfield & Lussier, 1997).	Innovation x Risk (Polarized axes with continuum, categorized options)	III	The description of each combinatory option allows a graduation between them.
An adaptation of the ANSOFF matrix for the Czech republic as a tourist destination (Palatkova, 2011)	Products x Markets	III	A variant with 12 cases. The diagonal gradient exists but is weaker than in the original (no symmetry between “concentric” options)
Product-Market Growth Strategies (Pleshko & Heiens, 2007).	Market Growth x Product Growth	III	Technically very close to Ansoff’s Matrix (but with the market axis horizontal and a focus on growth)
The product-Process matrix (Spencer & Cox, 1995)	Product structure x Process	III	The diagonal gradient is extremely explicit

	structure		
The four strategic alternatives (Tavana, 2002)	Total Euclidean distance from the Ideal threat x Total Euclidean distance from the Ideal opportunity	III	Options are localized in an Euclidean bi-dimensional Metric space.
Ethnomarketing Strategic Matrix (ESM) (Paramo Morales, 2005)	Customer Attitude x Firm Attitude	III	Colour patterns re-inforce the diagonal gradient
Product Matrix (Wind and Claycamp, 1976)	Each Axis is itself fractal with another dimension alternating with the first	IV	This is a matrix of matrixes, drawing. Each of the 9 cases is itself a 9-cases matrixes. There are 81 cases but no global gradient. The <i>milieu</i> is heterogeneous, totally different from a classical matrix
The Jigsaw strategy brand matrix (Lane & Sutcliffe, 2006)	Category x Brand	IV	Although the axes have their own gradient, the “jigsaw” segmentation of the bi-dimensional space has a central pole, in discrepancy with the angular position of the poles of the axes. Two gradient compete with each other and blur each other.
The strategy reference point matrix (Fiegenbaum, 1996)	Time x Internal-External x Inputs-Outputs	IV	A three-dimensional matrix drawn in rough perspective. This destroys the milieu of the matrix. The object has lost its individuality.

Table 3. Technical stages of contemporary matrixes