Innovation, Tangible and Intangible Resources: The ‘Space of Slacks Interaction’\(^1,2\)

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Complex interactions between different slack resources may affect the profitability of the firm in the medium and long term, while slack financial capital can trigger important and urgent innovative processes under certain conditions.

Introduction
The concept of what constitutes slack has varied over time, and the conceptual and empirical difficulties encountered whilst formulating a definition that is widely accepted, formed an obstacle during the research of this phenomenon (Bourgeois, 1981; Lant, 1985).

Many definitions proposed in the literature are rooted in the seminal works of Cyert and March (1963). Bourgeois (1981: 30) defines slack as ‘a cushion of actual or potential resources which allow an organization to adapt successfully to internal pressures for change in policy, as well as to initiate changes in strategy with respect to external environment.’ This is considered an evolutionary perspective in which slack qualifies itself, on the one hand, as a ‘cushion’ needed to contrast entropy to which the company system is subject and on the other hand, as an instrument for proactive change (Nelson and Winter, 1982). For Nohria and Gulati (1997: 1246), slack consists of a ‘pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output.’ This concept comprises idle productive factors — such as personnel in excess and underutilized productive capital — as well as unexplored opportunities to improve results significantly (turnover, reputation, demand, profit margin, etc.) that could derive from the market and innovations, factors that could be capable of bringing the company to the limits of the technology.

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\(^2\)Even though this paper is the product of unitary setup and reflection from both the authors, the fourth and fifth sections are attributed to Antonio Renzi, the first and second sections are attributed to Cristina Simone, while the third and sixth sections are attributed to both authors.
frontier. Sharfman *et al.* (1988) and Sharfman and Dean (1997: 199) have underlined the aspect of intentionalism within the organization of accumulation and detention of slack intentionally (‘we define slack as resource intentionally kept by a firm beyond those needed by an organization to meet its known commitments’).

Dealing with slack resources could mean a trade-off between two objectives that typically generate tension within economic organizations. On the one hand, there is a necessity to have slack resources — e.g., as a mitigating factor for entropy risk and a driver for potential flexibility and, therefore, the innovative and adaptive capacities of the company with respect to its context (Cyert and March, 1963; Hambrick and Snow, 1977). On the other hand, there is a necessity to contain slack of tangible and intangible assets, as per the principle of economic efficiency (Williamson, 1963, 1964; Leibenstein, 1969a,b). In this regard, it is noted that the choice to operate with a set of redundant resources creates a certain margin of protection and, in parallel, the formation, for a certain period of time, of sacs of inefficiency within the firm. From these observations, we can derive the ambivalent and oscillating role of slack: a resource that amplifies the choice of strategic options, as well as being the factor for inefficiency; the instrument for covering the risk of entropy; and the source for symmetric risk.

In order to correctly evaluate the role that slack can play within the strategic choices made within a company, we must take into account that it is not uniform in size or indistinct, but a phenomenon that is specifically composed and marked, that includes elements with heterogeneous nature — financial, relational, human, informative, cognitive, or operative. Each of these elements has its own strategic value and implies specific risks.

A dimension which helps us in the analysis of slack from the point of view of strategic options is that which refers to its absorbed state rather than its unabsorbed state (Bourgeois, 1981; Bourgeois and Singh, 1983; Singh, 1986; Sharfman *et al.*, 1988; Tan and Peng, 2003). The absorbed slack — tangible or intangible — has a specifically elevated use. In a traditional interpretation, it could be considered operative slack or, rather, a medley of redundant tangible goods and intangible resources likely to be annulled with the recovery of efficiency. From this point of view, the potential of flexibility connected to slack is mainly tied to specific increases in use of durable inputs (Herold *et al.*, 2003: 374). For example, it could be the case that a company with an excess of productive capacity offers an outsourcer to maintain or reach the desired levels of efficiency. It could actually be an intangible slack such as, for example, the resources and valuable capabilities that, for various reasons, are temporarily unemployed or underused (sleeping resources). Sometimes, highly qualified personnel who are temporarily inactive are available and, rather than getting rid of them, the company prefers to compete for the realization of intercompany projects in which the personnel can continue to be used, maintaining its capacities in use (‘remember by doing’) (Nelson and Winter, 1982). In preventing degradation in the ‘know how,’ one of the strategic options that companies often use with regard to slack is, in fact, the tool of collaboration agreements (Tsang, 2000: 221).

Unabsorbed slack represents available and general resources, or rather uncommitted resources that can be used for various initiatives: it is a type of slack with elevated discretion regarding its destination. This is the case for financial slack as well as particular types of intangible slack, such as reputation, relations, and in general those categories based on fiduciary relations.

**Slack and productive paradigms**

The first contributions indicate slack of resources as a phenomenon with prevalently negative implications (Cyert *et al.*, 1959). The term slack is used with reference to situations in which a certain relaxation, softness of the organization is such that it allows the physical resources as well as cognitive human resources to be deviated, moving away from the organizational structure. Examples of these situations can be seen in phenomena of hyper
productivity of human resources, or in the formulation and approval of the budget considered excessively ‘generous’ with respect to effective needs of the various company departments.

Starting from the 1970s, however, the term was used with positive connotations, taking on meanings of, for example, a free resource or reservoir of resources. In the decisional model known as the ‘garbage can model’ (Cohen et al., 1972), slack is defined as the difference between the resources of an organization and the combination of demand. It plays the role of depreciating resources among subsystems of the organization, consolidating in this way all intra-organizational ties. Paradoxically, around the same period during which the organizational and managerial literature produced numerous and important contributions that underline the positive valences of slack, the work problems and the discussion of the model of mass production had made slack of resources one of the organizational pillars.

In a complementary manner with respect to theory, it is interesting to adopt a perspective that is even more productive, and ask if and how the slack plays different roles under various conditions. This analysis seems interesting in order to enrich the concept of slack from another point of view, that of the production paradigm.

In the 1970s, the Taylor–Ford productive model manifested yielding signs. At the origin of the crisis were consistent rigidities, especially those of work relations and the labor market. The former included workers’ strikes on the assembly line and the difficulty of finding personnel, while the latter seemed unmanageable on the basis of the principles of mass production. An indication of inadequacy of the mass production machine is detectible in the magnitude of slack resources, from labor to materials, components and finished products. Stock, warehouses, and buildings are always even more overloaded and configure with the cause and effect of this rigidity. Each snag and obstacle in the productive flow will find remedy in a ‘cushion’ of resources that supply a temporary buffer (Accornero, 1994: 301–302).

Linked to variables which are more organizational than technological (Piore and Sabel, 1984), the passage from a paradigm of mass production to that of lean production partially plays on terms of conflict against fat and all that is considered redundant, against relaxation and organizational stretch marks: in one word, against slack. However, the symbol for excellence in lean production is an integrated manufacturer ‘with six figures’: ‘zero stock’ (meaning zero stock, zero inventory); ‘zero defects’; ‘zero conflicts’; ‘zero dead moments in production’; ‘zero waiting time’ for each client; and finally, ‘zero paperwork’ (meaning zero bureaucracy, no useless communication). We think of ‘just in time,’ the first pillar into which lean production can be classified: a management of ‘zero stock’ (or close to that) which leaves all defects visible, especially all the flaws that were hidden (Bonazzi, 1993).

However, reading in more detail — and with less stereotypes — the lean production underlines that, within this paradigm, organizational choices were not always made to eliminate slack, but some of the productive results were reached by leveraging slack, in particular linked to human resources and time. The most eloquent demonstration of how lean production has been imprinted in a univocal way on the elimination of slack lies within the modality of error management in the manufacturing body created by Taichi Ohno (1978), the founding father of the integrated manufacturer. Mass production is connoted by the practice of never stopping the assembly line, not even in the presence of evident work errors. It refers to ‘touching-up’ in a following moment with respect to the labor cycle and impeding the way to discover and eliminate the causes of defects. Instead, in the Toyota factory, the principle of no interruptions of the assembly line — for which failure to adhere implies a sanction for the Ford-style factory worker — does not find a place. Every worker must interrupt production by pushing a button when a problem is seen or found. Ohno established a system for problem-solving, named the ‘five whys’ — based on the fact that the worker can be granted the use of his work time and his intellectual energies in
the comprehension of errors, in the codification of a solution, and the capitalization as an advantage for the organization of learning thus (individually) obtained. Essentially, one of the cardinal elements of lean production matured in Toyota consists of leveraging slack in skills and experience with human resources. Employees draw from their slack for flexibility in work assignments and their slack in creativity in order to center improvements, instead of limiting themselves to problem-solving (Womack et al., 1990: 62–64). The expression of the workers’ point of view, even in informal and unstructured communications, and the application of cognitive energies, are a disturbance in the Taylor–Ford system. Instead, they are used within this integrated manufacturer as organizational resources in excess with respect to the contingent production. These resources are mobilized for continuous improvement. There is a trade-off between tangible slack and intangible slack in the passage from mass production to lean production, where the first is an obvious shield for material slack to guarantee the fluidity of the productive cycle and the resolution of exceptions and the second expels the superfluous — the material fat — by mobilizing invisible slack within the work force.

Therefore, whilst General Motors has always maintained that it was necessary to have supplementary space for working on vehicles and for the stocking of necessary inventory for constant production, the philosophy of Toyota on the quantity of space necessary for a certain volume of production is exactly its antithesis: it considers it relevant to designate the minimum space necessary to facilitate face-to-face communication between workers and does not provide dead areas for stock (Womack et al., 1990: 89). Instead, it relies on the existence of incorporated slack in human resources for the realization of efficiency objectives in the production system. Therefore, productive organizations classified in paradigms that are so ‘distant,’ all use slack to guarantee their functioning, their adaptation, and their survival. What varies passing from one paradigm to another is not, therefore, the leverage on slack (for lean production). Both paradigms use slack as a lung for their organizations. The ridge between the two paradigms is formed in terms of the trade-off between slacks of different nature: relying on slack that is prevalently tangible for the mass production paradigm vs. relying on prevalently intangible slack for lean production.

In conclusion, we believe that the ridge between mass production and lean production is not detectable in the tendency to rely on slack or in the tendency to eliminate it; rather, it takes advantage from both, if total slack is considered in the reference bin (Figure 1).

As we specified at the beginning, however, from the point of view of a single organization, it is important to appreciate the interaction between tangible slack and intangible slack. Indeed, the same resource, if designated for alternative purposes or used in alternative ways or in combination with different types and amounts of other resources, gives rise to a service or a stream of different services (Penrose, 1959: 40). So, all kinds of slack should be analyzed in a systemic way by taking into account the interaction of complex and heterogeneous resources in excess (financial, operational, human, etc.). The model proposed below is a contribution in that direction.

Slacks interaction and innovation: toward a model of analysis

Our analysis uses an interpretative model named ‘space of slacks interaction,’ founded on the composite nature of slack. The aim of the model is to offer an interpretation of the interaction of heterogeneous slacks with different innovation processes.

The model takes into consideration two kinds of slack: operative slack and knowledge slack. Regarding the first, we refer to what was described in the Introduction: it derives from the excesses in productive capacity (Bourgeois, 1981; Greve, 2003; Tan and Peng, 2003), and is typically due to oversized plant, machinery, and work force. It means that there is a redundancy of resources with a high absorbency level, having a low ductility with respect to
innovative capacity to create processes for strong change in productivity strategy.

As for knowledge slack, this is intended as intangible redundancy due to the wealth of knowledge found internally in economic organizations that can assume diverse paths. Such a form of slack is present especially in those companies that are strongly oriented toward an intense activity of R&D and/or toward the use and formation of human capital needed to amplify strategies for innovation.

The model assumes a direct correlation between the innovative propensity of companies and knowledge slack. This builds on two assumptions. The first is that economic and industrial performance depends on how knowledge slack is combined (i.e., aligned or misaligned) with operational slack. In essence, it is assumed that the alignment (or misalignment) between knowledge slack and operational slack is not neutral to the success of some innovative path. The second is that ‘non-neutral’ alignment unfolds different effects depending on the ‘nature’ of the innovative approach. With reference to the latter, given the heterogeneity of classifications found in the literature, we adopt the dichotomy for radical and incremental innovations.

As is well known, this dichotomy is based on the distance from innovations of products or processes (Dewar and Dutton, 1986). The radical innovations for excellence should have a character of absolute novelty and be significantly different from innovations of goods and production processes (Schilling, 2005: 45). Issues of innovative activities that determine ‘extraordinary breakthroughs’ in technological frontiers (Dosi, 1982) and in the emergence of new technological paradigms. The basis for this distinction is the concept of ‘technological discontinuity’ (Momi-gliano and Dosi, 1983: 31). The technical feasibility and economic exploitation of innovation will bring about a structural reconfiguration of the endowment of resources and expertise.

Incremental innovations, by contrast, are confined to the opposite extreme of the continuum. They are the result of ‘normal’ technical progress activities, corresponding to clusters of innovation along technical trajectories. They do not present characteristics that are particularly new or original, and consist of marginal changes or minor adjustments to existing solutions. In this case, technical viability and economic exploitation of innovation relies on a reservoir of knowledge and resources entrenched in
the company. This distinction is important with reference to our model. Indeed, it is assumed that the effects emerging from the interaction between the two types of slack (knowledge and operational) are different, depending on the type of innovation that the company is pursuing. In the case of incremental innovations, the two forms of slack act synergistically with respect to economic feasibility and strategic change. On the contrary, the feasibility of radical innovations increases at a pace equal to that of the knowledge slack, but less than that of the operative slack. The model is represented in a matrix form in Figure 2.

![Figure 2. The space of slacks combination.](image)

3 Naturally, a low vertical integration doesn’t exclude the hypothesis in relation to the positioning of ‘A’ that could, for example, relate to a company in which the propensity toward new knowledge is accompanied by a scarce capacity to maximize technical and operative efficiencies.

4 The appropriability — or rather, the capacity of a company to extract, acquire, and hold the annuities generated by their own knowledge resources — depends on, other than the alignment of heterogeneous slack, which we have discussed, an accumulation of other variables such as: the nature of various knowledge (codified and tacit; casual or ambiguous) (Lippman and Rumelt, 1982; Winter, 1989; Reed and de Fillippi, 1990), the efficiency of legal mechanisms for protection (Winter, 1989; Gille, 2005), the existence or otherwise of knowledge markets (Arora et al., 2001).
and/or process improvements are capable of annulling operative redundancies, and the probability of innovation appropriability of economic returns is high.

The northeast region refers to the combination between an elevated endowment of unexploited knowledge and a low level of operative slack. In general, such a combination relates to organizations that efficiently explore new knowledge in connection with the final product, as well as intermediary input and, at the same time, are capable of maintaining a high level of technical and operative efficiency. A paradigmatic case in the northeast region is the lean production models that use a high level of intangible slack and a strong propensity to cut tangible slack (for example, the warehouse). Another example can be found in those companies that, thanks to outsourcing operative processes, can liberate resources in such a way as to reinforce in-house knowledge and core skills.

It seems evident that the combination classified in the northeast is substantially speculative with respect to that expressed in the northwest. A low level of operative slack is, in fact, coherent with innovative rupture strategies when these undertake structural transformations resulting in contained loss of economic value of industrial assets. On the contrary, in the case of incremental innovations, the scarcity of operative slacks is not in line with the opportunity of high economic and productive growth.

The two northern regions (northwest and northeast) can also be read in terms of real options, such as flexible elements incorporated in company assets. These elements generate a positive correlation between risk and value, since the volatility of growth increases in connection with strategic and operative flexibility (Amram and Kulatilaka, 2000: 4). From this point of view, operational and knowledge slack are configured in two distinct portfolios of real options that in certain cases interact positively and, in others, interact negatively. In the presence of the opportunity to realize incremental innovations, the real options connected to knowledge slack assume an amplified value because of the benefit from real options incorporated with operative slack, and vice versa. By contrast, in the presence of the opportunity to realize radical innovations, the two types of options tend to be mutually exclusive. In fact, an elevated level of options in terms of operative growth limits the exploitation of options in terms of strategic growth.

Moving on to the southwest and southeast regions, they relate to the companies characterized by a cognitive wealth prevalently in operative routines. Notably, the southwest region denotes a condition that is highly negative in terms of potential flexibility and, therefore, it identifies scarce innovative capacity and, at the same time, economic inefficiency in the short term. In the specific case, in particular, the combination of operative slack and a low knowledge slack makes the company incapable of operating innovation (both incremental and radical) under conditions of oversized structural costs. A Ford-type production company crushed under the weight of its operative slack was incapable of innovating.

Finally, the southeast region refers to a company capable of maximizing efficiency in the short term, but incapable of quickly taking advantage of innovation opportunities. It is essentially a company capable of minimizing its operative costs, but fragile with respect to possible opportunities of change offered in this context.

The space of slacks interaction refers to a valid analysis for a company that has a sole product. In the case of a company that produces many different products, the analysis of misalignment/alignment of slack should be replicated in parallel for each area of business. In this last case, the company could pursue different options in various areas of business: radical innovation in certain areas, incremental innovation in others, and again exploitation of knowledge in other areas.

Positioning a firm in the ‘space of slacks interaction’ and risk

The proposed matrix shows how slack resources can act as mitigating factors and, at the same time, amplify risks for the company. In particular:
• The northern regions (northwest and northeast) imply a risk of oversizing the intangible resources.
• The southern regions (southwest and southeast) imply a risk of undersizing the intangible resources.

Both risk types find their roots in the possibility of dissolving the system, due to an incapacity of the same to compensate for the destruction of energy with the production of new energy. An ‘oversizing’ risk originates from the diachronic relation between income dynamics and knowledge slack. Such a risk refers to the possibility of errors in the choices that create redundant knowledge, whereby errors for surplus knowledge cause a counter-effect with respect to the desired one or a stiffened structure with respect to the volatility in context. It seems evident how the risk linked to each structural redundancy manifests itself based on the probability of loss of economic value.

In the hypothesis of ‘undersizing,’ the risk originates from the scarce propensity of the company to sustain the weight of momentary bags of inefficiency induced by the continuous development of knowledge. Another adverse condition could emerge from the insufficient capacity for management in the orientation of strategic choices. The outcome could be that of intensified constraints to growth or realized defensive investments.

Taking a closer look, both risks considered here refer to possible inefficiencies dictated, on the one hand, by ‘incorrect structural’ redundancies and rather low profitability in the medium term and, on the other hand, by insufficient resources (Antle and Eppen, 1985: 163). From the coexistence of risks of oversizing and undersizing, it emerges that the research for a correct trade-off between excess and rationalization of resources requires an elevated managerial capacity and the use of flexible interpretative models to juxtapose the typical optimizing procedures.

Furthermore, the risk for over- and undersizing assumes specific connotations in relation to the single regions of the graph (Figure 2). With reference to the higher regions, the risk for knowledge oversizing can be amplified or scaled by the operative slack. For example, with regard to the northwest region, such a risk can be due to the reciprocal effects of operative and knowledge slacks. In the specific case, therefore, the problem of oversizing does not stem from knowledge resources as such, but from the constraints exercised on these in terms of utility of the operative structure and in terms of the ability to use knowledge in favor of radical innovations.

**Financial slack and ‘space of slacks interaction’**

The feasibility of policies for the development of knowledge slack is strongly influenced by the capital structure and its ability to modify, where necessary, the relationship between debt and equity.

With particular reference to the ‘space of slacks interaction’ model, the movements in Figure 2 on the southern regions (southwest and southeast) toward the northern regions (northwest and northeast) require adequate terms not only on a quantitative level but also in the composition of sources of available financial capital. In fact, the literature on the topic has noted that the innovative propensity of companies, in particular in relation to the knowledge slack generated from investments in R&D, tend to be, within certain limits, positively correlated with financial slack. Such a form of slack emerges in the case of redundant liquidity (Voss et al., 2008: 149), where immediate and potential liquidity exceeds the financial needs in the short term.

The formation of financial slack depends, essentially, on a high capacity to generate free cash flows and a dividend policy oriented to grow. Financial slack can, in certain cases, emerge as a consequence of negative and/or wrong financial policies, instead of specific orientation of management.

Having clarified this, we have considered the financial slack that the company is capable of self-generating and follow a specific choice by its management finalized for the exploration of innovative opportunities. This basically
creates a difficult choice on the level of periodic profitability objectives for the sake of the relationship between the company and its shareholders. In fact, the redundancy of liquidity — similar to the redundancies linked to real activities — implies added costs: from the point of view of the company, the formation of liquidity acts negatively on immediate profit; from the point of view of the shareholder, the excess of liquidity reduces dividends. Against additional costs, financial slack favors the possibility of realizing investments in R&D rather rapidly, thus triggering urgent innovative processes.5

The positive relationship between financial slack and propensity for innovation can be explained, above all, in terms of reducing the constraints of remuneration of external lenders and, therefore, greater autonomy of the firm to realize innovative investments characterized by high volatility (Cyert and March, 1963; Nohria and Gulati, 1996; Geiger and Cashen, 2002). It means that financial leverage tends to reduce innovative propensity with the growth of the company (O’Brien, 2003: 420). Essentially, above all radical innovative propensity implies two combined effects with regard to the financial dimensions of the company: elevated opportunity costs linked to redundant liquidity and a low exposure to financial risk. This means that the elevated operative risk linked to knowledge investments tends to be compensated by a prudent capital structure.

Going back to the ‘space of slacks interaction’ model, financial slack appears to be functional in the vertical displacement from the bottom southeast up to the northeast region. It’s important to note that the southeast region distinguishes economically efficient companies, and expresses the typical condition in which a company is capable of generating elevated cash flows in virtue of the tendency of maximum exploitation of real assets. Therefore, in our perspective, the passage from the southeast to the northeast region is much more feasible if the firm has previously used its economic efficiency to generate cash reserves. This, as shown above, requests a relatively low draw on financial leverage.

Nevertheless, the positive effect of financial slack on the propensity for innovation is not linear. In fact, the empirical studies of Nohria and Gulati (1996, 1997) underline how, by surpassing a certain level of the current ratio, the relation between financial slack and innovative propensity is transformed from positive to negative.6 The results of both studies conducted by the authors can, therefore, be schematized by means of an inverted ‘U’ curve: on the one hand, the unabsorbed slack, which is therefore rapidly usable, can be qualified as a faculty of implementing R&D activities; on the other hand, strong excesses in liquidity that worsen the ‘discipline’ of management as per investment decisions. Excess liquidity feeds the innovative potential of the company only if maintained within moderate levels in such a way as not to favor opportunistic behavior (Geiger and Cashen, 2002: 70). Basically, Nohria and Gulati explain the non-linearity between innovation and financial slack following a contractual prospective using, in particular, conceptual schemes typical for studies on the relationship between capital structure and agency costs (Jensen and Meckling, 1976; Jensen, 1993). From this point of view, financial strategies support innovation and, at the same time, minimize the risk in agency costs, where optimizing processes have been installed for allocation of free cash flow, as the cash flow available for remuneration of capital and/or development of real assets. This implies the necessity to search a fair trade-off between R&D investments and dividend distribution.

5 Also, financial slack generated by the propensity for self-financing reacts positively to potential slack, or rather on the potential capacity of the company to obtain credit capital, in virtue of an elevated consistency of proper means with respect to net investments. The maximum level of potential slack is, therefore, reached in the absence of debt (Geiger and Cashen, 2002: 73).

6 Such a conclusion is congruent with that of Bourgeois (1981) and Yasai-Ardakani (1986) as per the existence of a line curve relation between slack and company performance.
From an evolutionary point of view, the inverted ‘U’ curve can be read in entropic terms (internally and/or externally) and enforced with organizational routines. For example, it is licit to suppose that, having surpassed a certain level of financial slack, the company decides — once a certain innovative strategy is realized — to feed R&D activities further. This would be directed to strengthening its own operative capacity and/or the degree of production diversification. The minor allocation of liquid capital in favor of intangible components can derive from the incapacity to exploit internal creativity, from the depletion of the same and of exogenous factors, as in the case of a market which is inadequate with respect to the hypothesis of highly innovative products.

The contractual and evolutionary perspectives are not necessarily seen to be opposites, in the sense that they represent two plausible and partial explanations regarding the lower part of the inverted ‘U’ curve: on the one hand, a strong financial slack can push toward ‘undisciplined’ management behavior; on the other hand, one must not overlook that innovative and absorbing potential in a company within an environmental context evolves according to vital cycles. Moreover, constraining the relation to be linear between slack and innovative propensity may bring us to an agency problem with the extreme and hard-to-accept picture of a ‘disciplined’ management of financial slack constantly feeding knowledge resources.

Moreover, coherent with what has been described heretofore, we can affirm that a managerial push toward the transformation of financial slack in knowledge slack (a transformation which is typically realized through R&D investments) also depends on the possibility of aligning the composition of slack with innovative trajectories that are pursuable in a given moment by the company. Based on this perspective, the choice of not allocating liquidity in favor of the exploration of new knowledge can be taken because of a negative interrelation between slack composition and the type of innovation which is realizable. From this point of view, the ‘space of slacks interaction’ offers an ulterior reading key for the inverted ‘U’ curve proposed by Nohria and Gulati. It is possible to hypothesize, for example, that if the dynamics favor radical innovations, the stimulus to self-financing new knowledge tends to increase in lieu of the faculty to position the company on the inside of the northeast region (high knowledge slack and low operative slack). In the specific case, in fact, the intrinsic quality of new R&D investment presents exploitation margins higher than positioning in the northwest region (high knowledge slack and high operative slack). In fact, in the northwest region, the realization of rupture innovations implies the depletion of operative slack, with the resulting consequences in terms of sunk costs and infra-organizational tensions.

From the reasoning proposed, on the one hand there is a relationship between the composition of asset slack and the level of financial slack in the sense that the potential profitability of the latter is affected by the presence of operative and knowledge slacks. On the other hand, a financial slack reacts, within certain limits, positively to the possibility of aligning innovative and compatible trajectories in a positive relation with tangible and intangible assets in excess.

Conclusion
The presence of slack resources within a firm has been considered in the light of managerial and organizational literature from multiple points of view: the type of resources (tangible, intangible, financial); the ambivalent and oscillating role of these resources in strategic choices; their different importance in the alternative paradigms of mass and lean production; the different nature of slack (operative slack and knowledge slack). This paper has focused on the interaction between slack resources with innovative processes within the company using a model featuring ‘space of slacks interaction.’ The interaction between operative slack and knowledge slack is firstly read within the terms of reciprocal alignment (or misalignment) to be connected with innovative processes within the company, the composite nature of slack and its
multiple functions. However, the dynamic interaction between the heterogeneous natures of slack is still shrouded in the shadows, because of the tendency to address the problem of structural redundancy in accordance with a distinctly functional perspective. It is no coincidence that in the various fields of management studies (manufacturing, finance, marketing, and organization) there are often contradictory conceptualizations that have emerged on the role of slack regarding the evolutionary dynamics of the company and its chances of survival. The adopted ‘space of slacks interaction’ model sheds light on these shadowy areas by moving away from the ‘functionalist’ logic and transposing the complex and heterogeneous nature of the slack phenomenon. Another strong point of the model consists in the way it configures itself in the basket of redundant resources in a company. In the ‘space of slacks interaction,’ redundant resources are not treated with a portfolio of independent assets but, on the contrary, according to a systematic vision of the overall budget for slack in a company. The model is capable of catching aspects of company dynamics that would escape, adopting an overall point of view in which the ‘dialect’ between different slacks is simply ignored. In particular, reading the relation between slack in terms of alignment/misalignment helps the setup of development plans in the company by calling attention to the interdependent relations between resources and the diachronic aspects that would otherwise not be caught with an additive approach.

This approach has allowed for ‘non-neutrality’ effects from alignment/misalignment of slack and the diverse valences on the innovative activity within the firm. Further research on the risk–performance profile and economic valuation of portfolios of slack resources could benefit from this type of analysis. The proposed model can evolve toward an economic/financial operationalism of the interactions between slack and innovation, also in virtue of real option combinations.

The present version of the ‘space of slacks interaction’ model presents some weak points. Firstly, it primarily distinguishes only two types of slack (knowledge and operative). In our discussion, however, we have added a third dimension referring to financial slack, which was treated outside the model.

Further extensions could adopt the articulated taxonomy of innovation, as for example that proposed by Abernathy and Clark (1985), by considering the conservative/destructive impact of innovation which is not only technological but also commercial. Finally, future researches could address testing the model presented here and elaborating adequate proxies for its practical implementation.

References


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**BIOGRAPHICAL NOTES**

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