

**Exploring Incubation Performances and Its Determinants**

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## **Abstract**

In this paper we explore the issue of academic incubators performances. We first discuss how and why universities entered the business arena to extract value from the knowledge they were creating. We argue that Universities followed two different strategies: a simple goal versus a mixed goals strategy. This dichotomy has made the issue of measuring performances a tricky one.

As far as performances in value extraction is concerned, huge differences exist. We suggest that available input resources are not a full account for explaining such differences. We argue that real commitment, specialization of resources and ability to modify and innovate internal processes can explain these differences. We use the Italian case as a test-bed for these assumptions.

## Introduction

In his passionate and moving introductory speech at University of Stanford in 2006, Steve Jobs ironically noticed that he had never been so close to a University before. His relationship with academia is well known: he dropped the college, attended only courses was really interested in and was mainly engaged in getting the right food for his mind. There is no evidence of useful contacts Jobs made when he was attending courses. This does not mean he wasted his time. For instance, he admitted that his knowledge of typewriting and keyboard characters was instrumental to the launch of the first Macintosh in 1984. However, as he made it clear in the speech, that knowledge became useful only afterwards, as he connected the dots.

One might conclude that Jobs turned out to be an out of ordinary entrepreneur despite his academic experience or, differently said, thanks to his shallow contact with the academy. His “out of the box” personality allowed him to learn fascinating things, with little concern on their possible future use and value. Should had Jobs behaved as a traditional university student, he would have not stumbled in knowledge that turned out to be relevant in the computer industry. Jobs attended academia back in the late ‘70’s. At that time, Universities were fully concerned with doing their “business as usual” as well as possible. None of them, to my knowledge, had established any entrepreneurial course<sup>1</sup>. Also, there were no entrepreneurial labs or incubators that assisted students willing to set an entrepreneurial career. Now, suppose Jobs attended the University today. He would be offered a vast array

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<sup>1</sup> An exception was Schumpeter that in 1948 established at Harvard the “Center for Research and Entrepreneurial History” and taught entrepreneurship to veterans of world war II (M. Landoni, personal communication)

of entrepreneurial and technological courses, as well incentives and prizes for new innovative ideas, space in an incubator to work with his team, as well as service and support for launching his venture. Nobody can predict whether in this scenario Jobs would have developed what he did, of course. However, without being too pessimistic, chances are that not any University would have been in the position to attract, retain and accompany such a talented entrepreneur. Most likely, several (if not all) Universities would have lost the opportunity to leverage the knowledge of a brilliant person.

Universities represent a huge repository of knowledge, both old and new. From an institutional viewpoint, Universities are both required to diffuse existing knowledge and to pass it to their surrounding communities, as well as to produce new knowledge in different fields. New knowledge represents a possible source of value, as in the case of new products and processes that leverage new discoveries. As far as value creation and extraction is concerned, up until the mid '70's there was a clear distinction between Universities, from one hand, and companies, from another. Universities were responsible to do on-the-edge research that eventually resulted in scientific breakthroughs. Companies – both newly born and existing ones – were responsible to turn these breakthroughs in technological and technical viable new products.

Over the recent years, this distinction has blurred and Universities have entered the business scene in order to extract value from new knowledge. Such extraction occurs mainly in two ways. From one side, Universities may transfer knowledge to existing companies and get fresh financial resources. This is for instance the case of patents, that can be licensed or reassigned. From another side, Universities might encourage new companies' creation, get minority equity and then extract value by selling it.

In this new scenario, the winning motto is “Universities have to enter the business arena” and develop a third mission (Gulbrandsen and Slipersoeter, 2007). Supporters of this view argue that Universities cannot be detached from the “real world”. Universities offering entrepreneurs training courses, both in their official and commercial programs, are getting widespread consensus. Universities setting up entrepreneurial labs and participating to incubators get positive feedback from their environment and can enhance their reputation. Skeptics of Universities entering the business arena argue that this consensus is to a large extent an outcome of converging and self-sustainable beliefs. In this view, at best, Universities aim at becoming entrepreneurial for institutional and mimetic reasons (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). Skeptics warn Universities of the risk of overlooking their mission to do (badly) a new job. To skeptics, Universities should limit themselves to their “original” mission and do it as good as possible, for academic and institutional regulation are at odds with extraction of value in the market (Teece 1986, Sullivan 1998). This skepticism highly contrast with a widespread diffusion of initiatives intended to allow universities not only to create but also to extract value. A large numbers of Universities offers not only entrepreneurial programs but also direct assistance to students and teams willing to exploit their intellectual capital.

A possible way to disentangle from the pro’s versus con’s dilemma and to escape from a binary approach (Universities should/should not) is to explore under which conditions is beneficial to directly engage in value extraction activities. The thesis of this paper is that not any University is in the position of doing a good job in extracting value from new knowledge, be it patents and new companies. Put it differently, we argue that it is time to investigate what the real outcome of such involvement is, consider costs and benefits of such programs and ask whether they

make sense from a resource perspective for a specific actor. The argument is that actual results in terms of value extraction do vary significantly among Universities. This is particularly true at international level, where differences in terms of institutional framework, rules and legislation might explain such a high variance. However, we suspect that huge differences do exist also at local level: some (a few?) Universities have achieved very good results, others (the vast majority?) have had bad performances and a small number are getting average results.

In this paper, we take as a test-bed the academic Italian setting, that we consider homogeneous from an institutional point of view<sup>2</sup>. Our aim is to control for the real outcome in terms of value extraction among the seventy-seven different Universities that have been active in Italy in the last fifteen years<sup>3</sup>. We maintain that available input resources, that can be considered as a pre-requisite for extracting value from knowledge, are only a partial reason for explaining such differences. Clear enough, Universities with several Departments spanning several scientific and technological domains, with hundreds of researchers and doctoral programs, are better equipped to extract value from knowledge than small, focused Universities. Available inputs – as available research on innovative companies clearly demonstrates (Chesbrough, 2003) - are not the only determinant of possible outcome, however. The same argument holds true for public organizations and

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<sup>2</sup> Thus, despite differences in norms and rules at local level. For instance, there might be differences from a human resource management perspective (e.g. full time chance for academic entrepreneurs).

<sup>3</sup> We set year 2000 as the threshold for several reasons: first, because in that year major Universities set up their first incubators; second, because it took several years to institutionalize these incubators, giving a lengthy approval process. Third, because Universities that were launched afterwards are to a large extent on-line Universities.

Universities, where some can do better than others having the same inputs, or achieve comparable results with less available resources.

We argue that three main variables might explain these differences. First variable is commitment, that is the willingness of an institution to enter a program of value extraction from internal knowledge<sup>4</sup>. Here we partition between a real commitment and a ceremonial commitment. Real commitment means a University has started the program of value extraction after a careful scrutiny of external threats and opportunities as well of internal strengths and weaknesses; has defined a several years program with specific targets to be reached; set up a specialized unit with a due organizational autonomy and an proper budget; devised an internal process to consider on a recurring basis pro's and con's. Ceremonial commitment means that a University has entered a program of value extraction largely as a result of environmental pressure to conform to an expected (socially welcomed) behavior. As a consequence, it has not carried out a rigorous process of scrutiny and has taken further actions only for getting external consensus and approval.

Second variable is the specialization of resources assigned to the program of value extraction. Specialization of resources has two main features. First feature is the amount of resources temporarily or permanently assigned to the program. Clearly, the more is not necessarily the better, but "reasonably adequate" resources are a necessary, not sufficient, condition to extract value from internal knowledge. Second feature is the quality of resources. By quality of resources we mean both the level of human capital made available to the program and the level of social capital

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<sup>4</sup> Internal knowledge may sound like an inappropriate definition in an era of recurring recombination between internal and external knowledge (Tanya and Pfeffer, 2003; Grimpe and Kaise, 2010). The concept is here meant to focus on inside (-out) processes, that is on knowledge that was mainly produced by internal members.

attached to it. For instance, suppose that University A and B have launched a similar program for extracting value from knowledge and assigned comparable resources. However, University A office is mainly formed by freshman, young personnel with no experience in any industry and a superficial knowledge – say – of the venture capital market. On the other hand, University B has chosen to complement internal, young and enthusiast personnel with well known past executives with a dense network of connection in several industries. Most likely, University A and B will achieve different results, other things being equal.

Third variable is the ability to modify and innovate internal processes to effectively extract value from internal knowledge. Universities are subject to a complex web of norms and regulations that can eventually result in poor action. For example, and because of these layered, often not coherent web of norms some Universities prohibit full time Professors to be actively involved in start-ups and spin-offs. Others do give permission, provided that Professors change their status from full time to part time. Others Universities allow Professors to keep their full time status if the University is a shareholder of the new company. These differences are largely due to a different interpretation of a common institutional framework, that can get modified by specific decisions of the Board of Directors of the University. These changes are just an example. Others include Universities setting up specific, new organizations to support their program for extracting value from knowledge, such as foundations, joint-ventures with other institutions and the like.

The paper is organized as follows: in the first paragraph we summarize main events and determinants that led Universities enter the business scene; in the second paragraph depicts two strategies, simple and mixed goals, adopted to enter the "business game"; in the third paragraph based on available evidence, we discuss existing research concerning outcome; in the fourth we propose a possible



framework useful for measuring incubators performances; in the fifth we examine the Italian case and provide support to our assumptions. We then draw conclusions and offer insights for future research.

Our investigation is largely conceptual, speculative and based on existing, mostly anecdotal evidence. Our contribution to the field is twofold. First, we propose a general framework that can be easily tested through usual statistical methods, once proper data are made available. Second, we offer a road-map to Universities to reconsider their action and their outcome in the field. More generally, we argue that value extraction programs are not “a bad or a good thing” in itself but ought be considered from a rigorous perspective. We argue that not every University can play the value extraction game for structural and organizational conditions. Both conditions are relevant and can make a difference: dwarfs can become good players in this game, giants may find themselves inappropriate.

## **1. How and why Universities entered the scene**

One might say that Universities, both in scientific fields and humanities, have always been deeply involved in creating value. As final stage in the education system, Universities have nurtured highly skilled human capital. Part of this human capital has entered the entrepreneurial career thanks to the previous knowledge provided by the academic system (Greve and Salaff, 2003). One may also say – contrary to Steve Jobs’ experience -- that Universities have always been a perfect spot to encourage entrepreneurial adventures. Universities do research on the edge of several scientific domains. This research may prompt relevant discoveries that in turn can favour new technological and technical innovations. Universities are also rich of social capital, because researchers have always been open to contact their

peers to exchange knowledge and discuss their discoveries. Back in the eighteen and nineteen centuries such contacts turn out to be crucial for young-to-be entrepreneurs. For instance, the Dean of Politecnico in Milan encouraged a young Giovanni Battista Pirelli to visit his colleague in 1872 to discuss possible application of a new process of making rubber. That visit sparked one of the most relevant manufacturing initiatives in the tyre industries and made Pirelli one of the main competitors in a very competitive – today oligopolistic – market (Polese, 2004 and 2006).

Universities decided to directly enter the business arena to extract value from new knowledge only in recent years. There is no one date that set this entry in every country. Universities in North America and specifically in United States were probably the first to take clear steps in this direction. Universities in Europe, despite the fact (or probably because) they were opened centuries before, were more reluctant to make this decision. In the United States the institutional shift towards business occurred smoothly. The structure of the University system allowed a strict cooperation with the business environment. Several (private) Universities received huge grants and paved the way for turning rural areas in the most advanced worldwide high tech district, as in the case of Stanford University. Grants and donations from past scholars as well as continuous research cooperation programs between Universities and companies do reveal a deep interdependency that is rooted in history. The same does not hold true in other countries, namely in Europe, where a rigid division of labour – companies doing business and universities doing research, each on its own side – has reigned for centuries.

In addition to huge cultural differences, we may also factor in differences in the overall legislation and in norms regulating the academic system across Ocean. Consider for instance enforcement of intellectual capital and dual ladder career. Both

are relevant in making the context good for business inside the academia.

Enforcement of intellectual capital provides researchers adequate incentive to both institutions and researchers, as patents' outcome are split between the two. Dual ladder career offers talented individual the possibility of shifting between business and university thank to a flexible market labour. Consider, on the other hand, Europe and Italy as a point in case. Legislation on patents has been modified and reinterpreted many times in the last decade, and incentives for researchers are still unclear; on the other hand, mobility between business and university is an impossible mission.

Nurturing entrepreneurship was natural and part of the job in the United States. In Europe the situation was quite different: as for Italy, one might think of the Pirelli case as an exception. Not surprisingly, studies on entrepreneurship report that in Italy entrepreneurs with an academic degree have always been a small minority (Curci and Micozzi 2004). To simplify, we might say that entrepreneurship was interwoven with the academic life in U.S., but occurred mostly outside Universities in most European countries.

However, it took decades also for Universities in U.S. to make the decision to enter the business arena. Simply put, this means Universities were ready to take some financial and economic risk in search for potential return. Patents were the first setting to play this game. Universities and public research centers entered the patent business, and have become a significant source of potential patents. Since the approval of the Bayh Dole Act (1980), University Technology Transfer Offices (TTO) have significantly increased their presence in technology markets. The number of patents filed by university researchers has surged since then, as well as licensing agreements between universities and corporations (Fabrizio and Di Minin, 2008). As well as spin-offs and start-ups is concerned, Universities in United States rarely

played directly the game and not surprisingly most famous incubators, as in the San Francisco Area, have been funded by individuals and private companies (XY Combinators; 500+; etc.). This is not to say that U.S. Universities were indifferent towards new companies in the high tech. They rather “left to the market” initial decision of nurturing and financing new ideas. They also assigned the decision to buy shares of new companies to their specialized investment units, as well as to funds they were participating to. Their surrounding milieu was more than enough to do the job of assisting new companies’ creation. As one Professor at Mechanical Engineer at Stanford states “by just walking outside the campus you can build the incubator that better suits your needs”.

Europe was in different conditions. It is almost impossible to consider Europe as a unitary entity (also) from this perspective. Simply put, we might identify countries and regions where Universities were open to business (United Kingdom, Belgium, Holland, etc.) and others that despite their tradition in entrepreneurship were quite reluctant. Italy is a case in point. Not only it is home of micro and small entrepreneurship, as more than 90% of the working population is occupied in companies with less than 9 employees. Entrepreneurship is regarded as a value in itself, as it crosses different social classes and has offered to many the opportunity of a better economic life (Paci, 1972). Despite this, Universities have remained suspicious and reluctant to enter the business arena. Up until the end of years 2000, some of them were offering administrative and bureaucratic assistance to researchers (quite rarely students) willing to patent their inventions. However, they did not provide services as far value extraction from patents is concerned. For the same token, they did not have teaching programs specifically targeting entrepreneurship, nor they provided ad hoc services for setting up new companies. Business was walking his side and universities theirs.

These conditions started to change around years at the turn of the century, for several reasons:

- the booming of Internet opened up unforeseen opportunities in different fields. New, totally different business models emerged. Dwarfs that started small soon emerged as gigantic entities. Quite often, these new companies were started by young people that leveraged their background and what had learned at school (e.g. Larry Page and Sergey Brin);
- Universities soon realized they were at the cross-road of new knowledge that could have been applied to specific domains. To some of them, pooling the resources needed to start a company was an easy game, due to the presence of a blooming venture capital industry;
- Highly skilled professionals like researchers and professors got increasingly attracted by a professional career and became available to assist their students in their entrepreneurial adventures;
- Universities experienced (especially in Europe) an increased financial pressure, as their environment was less munificent. Finding new ways for funding Universities became part of the agenda and helped loosen a legislation that was in several countries very restrictive.

## **2. Universities entering the business arena and the outcome puzzle**

Companies competing in the market arena are “easy” to measure. Different metrics exist, be it the profit (for the financial communities and the shareholders), the created value (for customers) or the satisfaction and payback (for suppliers). Like it or not, market rules set it clear that a company exists up to the point it produces more than it absorbs. Universities are a different story. First of all, most of them are

public and non profit oriented. Their outcome is judged according to different and variable measures. Different stakeholders of the same University may have different opinions and preferences on what the preferred outcome ought to be, so that the final evaluation is often a compromise. Second, measures to measure Universities performances do pose several trade-offs. One of the most celebrated one, at least in Europe, is between quantity and quality (enrolled students; graduated students; published papers, and so on...).

When it came to define what the outcome of entering the business game (as I called it) had to be, my assumption is that the overall population was somehow split in two. A first part of the population, probably including a good number of North European Universities, directly entered the business game for specific business reasons. This is not of course to say that these Universities wanted to distribute profits: they simply wanted to directly extract value from business and pass it to their internal institutional activities. Extracting, not only creating value was therefore the mission assigned to new specialized units. Having clearly defined what the mission was allowed them to adjust their decisions along the way. For instance, some Universities realized that the internal staff assigned to the new task was largely unprepared to do the job. The logic and background of an administrative, although highly skilled, clerk were at odds with what was needed to – say – find a customer for a patent, start a negotiation, finalize the deal. The same had happened in U.S. before. University of California at Berkeley provides anedoctical support: their internal units whose mission was to extract value from patents performed poorly for years until they recruited a seasoned manager who was in a short time able to achieve very satisfactory results<sup>5</sup>.

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<sup>5</sup> Personal communication, TTO Stanford University

A second part of the population entered the business game with mixed and intertwined goals. By large, most of them wanted to adhere to a “social”, increasingly popular request: Universities could no longer behave as ivory towers. Rather, they were requested to address social and economic challenges, helping their country to extract value from existing knowledge. Social pressure was also coming from internal members as researchers and professors, who wanted to keep their dual position and were reluctant to follow a restrictive regulation. Besides these common pressures, others Universities clearly perceived that entering the business game was a clever strategy to differentiate themselves from other competitors. Being closed to the business environment and nurturing inside entrepreneurship allowed for enhancing the University reputation both in the targeted population of students and in specific industries. Enhanced reputation and stronger ties provided in turn other positive side effects both for the institution (research projects; consortia; etc.) and for its members (assignments; jobs and the like).

These two different strategies (simple goal vs mixed goals) resulted in two different approaches. The simple goal strategy served to search the most appropriate available organizational solutions or to set a new organizational solution. At the same time, the simple goal strategy allowed for a process approach: rather than discussing alternatives in an abstract way, it permitted to focus on costs and benefits of past actions as well as on needed changes. I have no direct evidence, but I suspect that the simple goal strategy avoided possible misunderstandings with stakeholders. For example, it helped to distinguish between for profits activities (e.g. the university participating to a fund for new companies) and educational activities (e.g. an internal lab to develop business games).

Universities following mixed goals strategy probably enjoyed more degrees of freedom at the beginning, as they were able to switch among different alternatives

and to present most convenient measures. However, I suspect that mixed goals strategy was effective up until the overall environment remained munificent. Costs of entering the business arena remained for years sunk, and benefits largely not defined.

### **3. Performance measures**

The simple goal strategy and the mixed goal strategy are probably the two extreme poles as far as value extraction is concerned. In reality it would be difficult to find a “pure”, fully representative mode in both case for at least two reasons. First reason is that University’s shareholders and stakeholders may differ, forcing dominant coalitions to “compromise” and to find a satisfactory equilibrium. Second reason is that also regulated environments can change, thus forcing dominant coalitions to not pledge fully measurable results.

By using Thompson (1967) seminal work, we can possibly frame how Universities decided on value extraction. Two are the relevant variables for Thompson: the chain means/ends (clear versus unclear) and the nature (crystallized vs uncertain) of organizational preferences. Measuring both is not an easy task.

Placing the two strategies into Thompson’s scheme is possible as far as preferences is concerned: simple strategies correspond more to crystallized preferences whereas mixed strategies correspond more to uncertain preferences. Assessing whether the chain means-ends was clear or unclear requires a longitudinal approach, but a traceable internal process where real outcome were discussed is necessary, yet not sufficient, condition. We can therefore assume that



simple strategies called for (comparatively) simple measures. Mixed strategies called for several, possibly contradictory measures<sup>6</sup>.

The issue of how to measure Universities involvement into the business arena is still unsolved. Not surprisingly, input measures are being used to seize output measures, at least from a business perspective. Patents are a well known case in point. Universities count (not measure!) how many patents they file every year. From this perspective, it follows that the more the better. However, from a business and economic perspective it is not the rough number that matters, but how much value patents can carry both indirectly and directly. Indirect value occurs when patents protect products and processes. Patents allow for temporary monopolies and extra-profits that can offset risks and costs of patenting. The more is not necessarily the better: patent can be of poor quality (Lanjouw and Schankerman, 2004), bear costs for annuities and renewals (Granstrand, 1999) and provide little economic benefits.

Revenues from technology transfer are a much more reliable measure. Universities develop internally research that can be fruitfully passed to companies. Universities are not in the position of economically leverage such knowledge, for the lack of complementary reasons or more often because commercial and market exploitation is risky. Rather than keeping this knowledge into a drawer, Universities can “sell” or “licence” this knowledge. In turn, Universities receive economic resources that can be re-transferred to the internal research.

Measures of incubators abound. Probably the most known measures are those grouped in the University Business Incubator Index (UBI). This index ranks incubators, defined as an entity affiliated to a University, whose object is to facilitate entrepreneurship, with quality control of intakings and regular exit of ventured firms.

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<sup>6</sup> *En passant*, too many and contradictory measures tend to be close to no measure at all.

UBI ranks incubators according to three performance categories (value for the ecosystem, value for client, attractiveness), seven performance sub-categories (economy enhancement, talent retention, competence development, access to funds, network enhancement, incubator offer, post incubation performance) and more than sixty keys performance indicators. As in any ranking one might be skeptical of the assigned weight, or argue that some indicators are disputable, some dubious (# of contacts) and some contradictory (profitability may be at odds with # of staff).

A large number of key indicators seem to suggest that as far as incubators is concerned Universities can enjoy high degrees of freedom in evaluating their outcome. It is true that incubating new firms is a multifaceted task with various possible (positive) side effects. Time issue is also critical: incubating new firm is a lengthy and sometimes painful process. It might take several years. External conditions may change abruptly and new technologies can make promising projects useless. However, we argue that value extraction parallels Occam's razor. Universities that evaluate their efforts in incubating new firms according to a value extraction criterion are better off than Universities picking (ex-post) the combination of goals that better suits their actual performances.

#### **4. A possible framework**

Setting value extraction as an overarching goal makes things easier. Not paradoxically, this goal-setting is coherent with the institutional mission of diffusing knowledge. To a large extent, Universities are not profitable entities. Additional value they can extract from patents, transfer of technology and new firms can be returned

to research and education. Because of decreasing funding, especially in Western Europe, Universities ought to be highly concerned with value extraction.

The real issue becomes what makes value extraction possible. Why some Universities extract considerable value and others get only modest results? One might frame the problem by saying that Universities have little control over their environment. Munificent environments will make value extraction easy to achieve; poor environments will make the same mission impossible. Universities are highly dependent on their environment, as any organization (Pfeffer and Salancik, 1978). They are subject to a multilayered regulation. Regulations do vary considerably among countries. One might conclude that incubators are highly country specific. However, recent reports (BIBLIO) clarify that there is no “average” (national) performance. In a specific country, some incubators perform well whereas others perform poorly, a pretty evident conclusion if one admits that organizations are not a byproduct of the environment they live in.

Another possible explanation is the amount of resources Universities can count on. Large Universities with several Departments, a large number of researchers and a wide focus should outcompete small Universities with a few departments, a modest number of researchers and a narrow focus. Simply stated, the higher the input the (more than proportionally) higher the output.

This explanation is of little help and possibly misleading, however. Resources and size matters, of course, but they are only a poor proxy of what the possible outcome can be. To support this statement, I have compared two European Universities as far as input and output measures is concerned. The comparison is highly incomplete, but it is illustrative of the argument.

(Insert Table 1 here)

To make sense of the possible differences as far as value extraction is concerned, I suggest a simple framework with three main variables

First variable is commitment, an hallmark of organization theory (Kessler, 2012). Here I distinguish between real and ceremonial commitment. Real commitment means that value extraction has a relevant place in the agenda of the dominant coalition. Dominant coalition perceives value extraction as a positive outcome and as a result that is possible, no matter the external constraints. Several variables at different level may be used to control if a University is really committed to extract value. For instance, if the dominant coalition devotes a considerable amount of time and attention to this issue, we may infer that commitment is real. For the same token, if value extraction brings along clear goal-setting and “measurable” incentives, we may conclude that commitment play a key role. Cerimonial commitment means that the University and its dominant coalition do not really believe value extraction is a critical component. The dominant coalition has other priorities and value extraction is low in the agenda. However, to comply with dominant beliefs or to please important stakeholders, a dominant coalition can embrace value extraction. Under these conditions, commitment becomes largely ceremonial and ritualistic: the more value extraction is extolled and celebrated, the less is supported. Distinction between real and ceremonial commitment can be articulated along Argyris and Schon (1974) seminal contribution on theories of action. They distinguish between theories-in-use and espoused theories. Theories in use govern actual behaviour and tend to be tacit structures. Espoused theories are words we use to convey what an organization would like others to think it does.

Second variable is specialization and autonomy of resources. Specialization of resources is to some extent dependent upon commitment. Clearly, Universities

that do not want to commit to extracting value tend not to specialize resources to this end. The other way around does not necessarily hold true. In my view, specialization of resources means more than assigning people to the complex task of extracting value. If an organization commits to this, long term goal, a careful scrutiny of what is needed is a first, necessary step. Dealing with the business environment is not the same that dealing with education: language, procedures, skills and competences do differ significantly. Modifying role and tasks of internal personnel can be an option. The other option is to hire specific resources coming from business. One way or another, the issue of compatibility may arise. A possible way out is to set up a dual organization or to promote to some extent ambidexterity (O'Really and Tushman, 2004). However, I suspect that business and education don't have much in common. For sure, significant degrees of autonomy are needed if an internal unit has the mission of extracting value.

Third variable is is the ability to modify and innovate internal processes to effectively extract value from internal knowledge. Universities are to a large extent bureaucratic organizations, where rule following is king. Following rules stabilizes the environment, reduces uncertainty and economizes on decision-making. However, following rules bears an high price when flexibility is needed and when decisions need to be made quickly. Internal, lengthy procedures might become incompatible with urgent needs of customers, suppliers and partners. The cost of organizing cooperative action may simply become unbearable. To solve the contradiction, Universities have to option. First option is to modify internal processes, for example by approving rules and norms tailored to business needs. Most likely, these rules and norms are more effective if decision-makers can "interpret" them and adapt to the real issues they are facing. Second option is to innovate internal processes. The distinction between modifying and innovating internal processes might seem very

subtle. Innovating internal processes simply means that the dominant coalition takes proper institutional action. For instance, it might set up an autonomous unit, set-up an holding company to coordinate its activities and even outsource (partially or totally) to an external entity.

## **5. The Italian case**

The University system in Italy has skyrocketed in the last decades. At the beginning of the '60's there were slightly more than 300 thousands students; 718 thousands in 1970, one million in the 80's, 1 million six thousand in the '90's and 1,78 milion in 2010 (Miur, 2011). As a result of increasing demand the supply has changed considerably. In the '80's there were 51 Universities. In 2010 there were 92 Universities, including six Special Schools and eleven on-line Universities; 5.835 different programs (undergraduate and graduate), 171.066 different courses, 61.922 teachers and researchers; 59.912 technicians and administratives. In twenty year, the system has doubled in size

(Insert Table 2 here)

A few universities concentrate the student population: approximately 40% are enrolled in the 10 largest state universities. The student population in the 20 smallest universities, of which 17 are non-state institutions, is only 18,753 (Turri, 2014). The University system is mainly public, with only a few private Universities, i.e. Bocconi, founded in 1902 by initiative of Ferdinando Bocconi to honor the memory of his son who died in war and Luiss, established in Rome by a group of entrepreneurs in 1974.

Since year 2000 public funding has decreased considerably in relation to the number of students. Data on the government funding mechanism operating since 1994 reveal a steady decline, that was partly compensated with revenues from external sources – mainly student tuition fees, the supply of services and income from research grants and contracts (Turri 2011).

(Insert Table 3 here)

The University system is heavily regulated through a stratified, not always coherent cluster of norms: for example, in 2001, 350 different laws passed in the previous seventy years were grouped and made coherent under a common umbrella. In 2010 Law 240 introduced important innovations with two major implications. First implication was the strengthening of the university executive embodied by the rector, a reduction in the influence of collegial bodies, enhancement of the role of departments and high regard for the university as a corporate actor. Second implication was reinforcement of authority and functions of state bodies and restricted university autonomy. Recruitment and academics' careers within universities were also regulated by a national competitive exam. External evaluation procedures were strengthened, particular emphasis was placed on ex ante evaluation and there were further restrictions on setting up degree courses in relation to minimum requisites (number of academics, their particular discipline and number of seats in lecture halls). This was true re-centralisation, since it demolished the universities' freedom to recruit new staff and set up degree courses, which were two of the pillars that had served to introduce greater university autonomy in the 1990s.

In Italy, academic incubators date back to the end of '90s. The process was to a large extent bottom-up. Professors and researchs acted as evangelists in their

institutions. They offered conceptual reasons to their dominant coalition to set up incubators and more generally to enter the business arena; they also offered empirical support and patiently built consensus around the idea. A few examples of public funded incubators in Italy date back to the Eighties on the wave of an increasing awareness shared in Europe about entrepreneurship. However, these incubators supported entrepreneurs mainly in manufacturing and in backward regions. Only at the turn of the century universities became involved in the establishment of academic incubators. Today they are mainly devoted to transfer academic knowledge to new, innovative start-up (Auricchio *et al.*, 2014).

Today, academic incubators represent a significant proportion of active incubators, be it private or public. Auricchio and colleagues (2013), based on a 2012 survey, estimate that in Italy there are 61 active incubators, mostly in the North. 36 of them public.

(Insert Table 4 here)

I have run a web search to double-check this basic information. My starting point was PNI website. PNI is the association that gathers all Universities incubators and Universities promoting business plan competition. There are currently 36 members of this association.

(Insert Table 5 here)

Be a member of PNI should mean to be committed to value extraction. However, only 22 Universities offer information about what they do. Out of 22 Universities, 4 are mostly engaged in business plan competitions. 18 report



they have an incubator. Seniority of incubators vary: a few were established between the end of the '90's and 2002 (e.g. University of Trieste, Alma Laurea of Bologna); some between 2003 and 2006 (e.g. Milan), but the vast majority has started after 2007 (e.g. Bocconi University). Seniority is not in itself revealing: late comers may take advantage of others' experience and perform brilliantly. However, it is likely that some of late comers practice a ceremonial commitment. Universities engaged into business incubators since late '90s exhibit higher commitment and it is likely that their dominant coalition devote more time and attention to the practice.

As far as specialization of resources is concerned, we observe huge variation. The sample can be split in three sub samples. First sub sample is characterized by a null/low specialization of resources. Value extraction activities are exclusively carried out by internal personnel. Not surprisingly, most of the duties and services offered are administrative and bureaucratic (e.g. assistance in filing a patent). Internal personnel get reassigned to new tasks, sometimes with a superficial training. No different structure of incentives exist. Second sub-sample is characterized by a medium specialization of resources. Internal staff is mainly responsible for offering value extraction services, but their recruitment does not follow only a simple administrative logic. Internal staff is requested to to analyze and select projects, offer bridging services (e.g. towards the business community), assist new projects over time. Moderate ad hoc incentives can be designed to incentivate internal staff; external consultants may complement the team, need it be. Unimitt (University of Milan) is representative of this second sub-sample. Third sub-sample is characterized by an high specialization of resources. This is mainly the case of incubators relying on full-time professionals. Full-time professionals have a

different background. They do not come from academia, but rather from industry and consultancy. They were mainly active in business development or worked on a project basis for new products- processes. Compensation and incentives are tailored according to their background, experience and responsibility. I3P (Politecnico of Turin) is illustrative of this sub-sample.

As for the ability to modify and innovate internal processes to effectively extract value, Italian incubators are split in two. On one hand – the vast majority – there are incubators whose set up and managing did not bring along substantial changes or innovations. These incubators were smoothly established within the given institutional framework and did not command major shifts. On another hand, a few incubators were established within a different context. Funding universities searched for the most appropriate organizational solution, be it a foundation, a separate entity (e.g. an externally controlled company) or a consortium. This is for instance the case of Politecnico of Milan and of University of Bologna.

## **6. Discussion and conclusions**

Asking whether Steve Jobs would have benefitted from the assistance of an University incubator was obviously fictitious, but somehow instrumental to frame the argument of this paper. We started examining general reasons that prompted Universities enter the business arena. Universities entered the business arena for several reasons.

We argued that measuring the outcome of this entry is not an easy job. We have suggested to discriminate between simple and mixed strategies. Simple strategies imply that Universities try to appropriate some of the value they create. Mixed strategies means that Universities try to accomplish multiple goals at the

same time. Universities pursuing mixed strategies can accommodate several stakeholders' preferences in the short term, but long term they risk to get stucked.

Extracting value from knowledge is a serious issue. Universities have evident incentives to do so. In most countries they are facing financial constraints and substantial definancing. Extracting value might represent an effective way to pursue institutional mission. Value extraction at University level mainly occurs at three levels: patents; tecnology transfer and new ventures. Within different time intervals, all approximate how much value gets created and directly extracted by Universities. Over the recent years, Universities have rushed to promote several initiatives to extract value. Set-up of technology transfer offices and of incubators are two examples in this respect. Empirical evidence suggests that, controlling for value extraction, there is a huge variation. This seems true especially at international level. Not surprisingly, input measures in creating value are weakly (negatively?) correlated with output measures. At national level significant, but less robust variance seems also to exist.

We have proposed an overarching framework to account for these differences. We have assumed that commitment, specialization of resources and ability to modify and innovate internal processes might turn out to be extremely relevant. A preliminary exam of the Italian case bears indirect evidence to internally controllable variables as main drivers of future outcome in extracting value. If these results would be confirmed through a deep analysis at population level, several managerial implications would follow.

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Table 1

University of Milan vs University of Cambridge, 2012

	UNIVERSITY OF MILAN	UNIVERSITY OF CAMBRIDGE
<b>Population</b>		
-number	2,5 million	0.55 million
-average growth rate	2%	22%
<b>Organization</b>		
- Departments (Number)	31	100**
- Professors (Number)	≈2300	1616
<b>Students</b>		
-number	58.546	19.166
-undergraduate	37.465	11.820
-graduate	21.081	7.346
<b>Intellectual Property</b>		
-active patents	97	1000
-revenues from IP (million)	< € 0,3 ***	£ 16.6
<b>Spin-off</b>		
-number	24	68*
-sales of equity	0	£ 1.7 million*

\*: 2011

\*\* including Faculties, Schools and other Institutions

\*\*\* estimate

Source: TTO Cambridge, Unimi

Table 2.

Growth of Italian universities since Italian unification.

YEAR	STUDENT POPULATION	GRADUATES
1861	6504	n.a.
1870	12,069	n.a.
1880	11,871	n.a.
1890	18,145	n.a.
1900	23,033	n.a.
1910	26,850	n.a.
1920	53,234	8654
1930	46,262	8606
1940	127,058	11,934
1950	231,412	19,724
1960	268,181	21,886
1970	681,731	56,895
1980	1,047,874	74,118
1990	1,359,787	90,161
2000	1,673,960	161,484
2010	1,780,65	293,022

Source: Central Statistics Institute (Istat).

Table 3

Variation in the FFO between 1994-2010.

YEAR	FFO IN EUROS	FFO (CONSTANT PRICES, REFERENCE YEAR 2000 =100)	CONTRIBUTION PER ENROLLED STUDENT (CONSTANT PRICES, REFERENCE YEAR 2000 = 100)
1994	3,547,532,000	72.9	75.5
1995	3,698,631,000	72.2	73.2
1996	4,669,686,000	87.7	87.7
1997	5,065,436,000	93.5	94.3
1998	5,272,935,000	95.6	96.3
1999	5,401,576,000	96.5	96.9
2000	5,743,265,000	100.0	100.0
2001	6,010,548,000	101.9	101.8
2002	6,209,630,000	102.8	101.8
2003	6,268,368,000	101.3	96.7
2004	6,451,557,000	102.2	95.5
2005	6,847,913,714	106.7	99.8
2006	6,952,846,426	106.2	99.6
2007	7,052,775,587	105.9	100.2
2008	7,351,455,890	106.9	100.1
2009	7,274,383,089	105.0	99.6
2010	6,999,813,087	99.5	94.2

Source: Turri (2014)



Table 4

## Active incubators in Italy

Region	Incubators (all)	Incubators (public)	Ventured companies	Employees (average, last 5 years)
Piemonte	3	3	15	8
Lombardia	7	5	16	9
Trentino Alto A.	2	2	54	24
Veneto	4	2	12	48
Friuli Venezia G.	3	2	16	5
Emilia Romagna	9	5	10	5
Toscana	10	7	70	17
Umbria	1	1	30	8
Marche	2	1	10	21
Lazio	4	3	39	12
Abruzzo	3	3	13	2
Molise	1	1	18	3
Campania	3	2	14	5
Puglia	2	2	5	3
Sicilia	2	2	16	94
Sardegna	2	2	10	2
<b>Italia</b>	<b>58</b>	<b>36</b>	<b>16</b>	<b>16</b>

Source: Bank of Italy

Table 5

## Members of PNI

3P – Incubatore di Imprese Innovative del Politecnico di Torino
Politecnico di Milano
Scuola Superiore Sant'Anna di Pisa
Università degli Studi di Udine
Università degli Studi di Padova
Università degli Studi di Trieste
Università degli Studi di Perugia
Università degli Studi di Torino
Università degli Studi di Milano
Università Cattolica del Sacro Cuore di Milano
Università degli Studi di Pisa
Università degli Studi di Firenze
Università degli Studi di Verona
Università LUM – Jean Monnet della Puglia
Università della Calabria
Università del Salento
Università degli Studi di Sassari
Università degli Studi di Palermo
Università degli Studi di Messina
Università degli Studi di Foggia
Università degli Studi di Ferrara
Università degli Studi di Camerino
Università degli Studi di Cagliari
Università degli Studi di Bari
Università degli Studi dell'Aquila
Università degli Studi del Piemonte Orientale Amedeo Avogadro
Università degli Studi del Molise
Università Commerciale Luigi Bocconi di Milano
Università Ca'Foscari di Venezia
Università Luiss Carlo Guidi di Roma
Almacube – Incubatore dell'Università di Bologna
Università degli Studi di Modena e Reggio Emilia
Università degli Studi di Macerata
Consorzio Sapienza Innovazione
Università degli Studi Trentino Sviluppo
Università degli Studi di Catania

Source: [www.pni.org](http://www.pni.org)