

# Be vicarious: The challenge for project management in the service economy

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## Abstract

*Purpose.* The paper aims to answer to the following questions: which are the critical dynamic capabilities to survive in the rubber landscape of service economy? Does it exist in service economy a dynamic capabilities provider?

*Methodology.* The paper combines the literature review on dynamic capability perspective and that on vicariance to the Project Management professional services.

*Findings.* Firstly, the paper identifies vicariance as an intriguing dynamic capability, crucial to survive in the rubber landscape of service economy. Secondly, the paper sheds light on Project Management (PM) as a vicarious that provides vicariance.

*Practical implications.* For each critical organizational dimension, the paper identifies the links among the service economy challenges and the vicariance typology required to the project manager to face those challenge.

*Originality/value.* The approach to conceive the PM as a vicarious that provides vicariance is original and leads to new insights on the professional services management. In fact, on one hand, dynamic capabilities cannot easily be bought through a market transaction; on the other hand, they must be built. This building can be achieved internally, by the organization itself (i.e. hierarchy), or through a partnership (i.e. hybrid form among hierarchy and market). PM professional services enrich organizations with additional information variety according to a hybrid (i.e. non- market) coordination model.

## Keywords

project management; vicariance; dynamic capability; information variety; service economy

## 1. Introduction: service economy and the need for vicariance

Services are indispensable in almost all human activities (at individual and organizational level; in public as in private sector). One of the most salient, interesting trends in the post '50s world economy has been the rising importance of service sector (Buera and Kabosky, 2009). The term “service economy” draws the attention on the relevance of services in creating wealth. The service economy is characterized by the following drivers (Fuchs, 1968; Heskett, 1986; Giarini, 1987, 2005; Gallouji, 2002; Simone, 2011; Metcalfe and Miles, 2012; Al Am and Simone, 2013; Cioban, 2014): a) the dematerialization of the value chain; b) the search for economic flexibility, creativity, and for knowledge integration; and c) the globalization of the cooperative arena (Fig. 1).

*Dematerialization of the value chain.* The success of service provision increasingly depends on the firm's ability to extract value from intangible resources (codified and tacit knowledge; brand; patent etc.) rather than tangible resources. Thus, the share of added value that stems from processes centered on intangible resources (e.g. R&D, design, product customization, customer care) is larger than the share from tangible assets: physical capital is less crucial for the survival of the company and less strategic for the purposes of superior profitability. The growing centrality of intangible assets requires a rethinking of the composition of productive capital. The service economy calls for the downsizing of material slack, which is a source of inefficiency, in light of the need for intangible slack, which is a source of flexibility (Renzi and Simone, 2012).

*Economies of flexibility, creativity, and for knowledge integration.* They are more and more becoming key conditions for customization and innovation. Creativity, discontinuity, serendipity, and analogical thinking thus become the keystones to customize the market needs and to innovate (Barile et al., 2015).

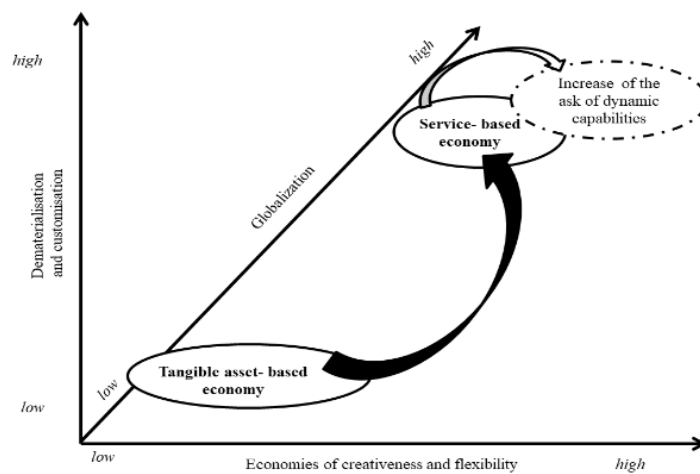
*Globalization of the cooperative arena.* The enhancement of the value chain occurs in an increasingly global economy. The competitive arenas are no longer circumscribed as restricted geographical areas. Competition occurs on a global checkerboard and at a global scale. The challenge is to fit into long nets that govern strategic networks that are no longer self-contained in a well-defined and circumscribed geographical region but are territorially extended and open upstream and downstream in geographic terms.

The interaction among these three dimensions creates a rubber (complex and uncertain) landscape that implies for organizations to revolve around the need to widen the information variety endowment and to repackage an organization's set of capabilities (Newell and Simon, 1972; Holland, 1975; Levinthal, 2000). Widening the information variety endowment and repackaging the organization's set of capabilities ask for dynamic capabilities.

Which are these dynamic capabilities? Does it exist in service economy a dynamic capabilities provider? This work is a tentative to answer to these questions.

In particular, rooting in the dynamic capabilities perspective, the paper starts to identify vicariance as an intriguing, crucial dynamic capability (Section 2); then, the work identifies Project Management (PM) as a vicariance provider (Section 3): Section 3.1 describes the flow of professional services provided by Project Management, Section 3.2 describes the typology of vicariance linked to the PM professional service.

Figure 1. The rise of service economy: the main drivers



Source: adapted from Simone (2011: 9).

## 2. Vicariance: a dynamic capability to face the challenges of the service economy

To solve a problem, an organism has to be able to perceive, capture, decide or act in several ways (vicariance) with respect to the context, to compensate deficits and face new situations. The term “vicariance” derives from the Latin *vicarious*. Literally, it means “substitute” that in turn comes from *vicis* (change). This concept of substitution extends both the original, Latin, meaning, and the sense of the Indo-European root of the word: it means “turning”, “curving”. The term *vicar* is defined by the neuroscientist Alain Berthoz as the act of replacement of a mechanism or a process which might lead to the same result (Berthoz, 2013). Interested in the various perceptive and intellectual strategies implemented by an individual in solving the same problem, the French School of differential psychology (Reuchlin, 1978; Lautrey, 1990, 1995) defines this orientation as *functional vicariance*. Biology and ethology, on the other hand, describe vicariance as the capacity of the living organisms to exploit the surrounding world in a different way, according to the limits and objectives of their Umwelt (Uexküll, 1933). This is the so called *vicariance of use*. However, this does not exhaust the width of concepts that qualify the term. In biology, alveolar vicariance indicates the mechanisms of supplying the air of the lungs through parallel channels that can replace each other. In paleontology, it is distinguished between *biogeographical vicariance*, understood as the variety produced in animal species due to the continents drift and *ecological vicariance*, that refers to the mutations of species introduced by climate changes. Such changes do not occur as the result of a voluntary adaptation, but they emerge from the wide redundancy of resources: a redundant system, in fact, can compensate for the inefficiency of a process with another process. Creativity and innovation, therefore, are deeply rooted in the history of human beings and organizations and emerge from their interactions with the environment. Vicariance directly pushes on the functional and cognitive pleonasm that connotes the biology of the viable entities. The social system, therefore, is the immediate derivation of a constant process of natural creativity: it is not only the product of engineering activity but the result of the work of a bricoleur (Lévi-Strauss, 1962; Barbetta et al., 2004). It can be tied - in the theory of evolution - to the concept of

exaptation, a process by which a feature of a given entity is accidentally co-opted for a different use than the one initially possessed (Gould & Vrba, 1982), designing a constructivist approach to life. Organisms and niches (biological, social, or technological) constantly make and dissolve, “each organism simultaneously produces and destroys the conditions of its existence” (Lewontin and Hartl, 1991). Vicariance, thus, is a combination of possibilities, not a tool for efficiency improvement. It enables the reinterpretation of biological, social, economic goals of individuals and organizations, acquiring its own autopoietic nature (Maturana and Varela, 1980). So, referring to human beings and human society, vicariance is the specific faculty of man to create imaginary scenarios (*transformational vicariance*). For all the above reasons, vicariance is the forerunner of flexibility, creativity, discontinuity and serendipity. And it could be considered as a cognitive, intangible source to set and solve new problems or to face in an original way (i.e. more efficient/effective/sustainable) old problems. Although the multifaceted nature of vicariance, managerial scholars have until now underestimated its potential in investigating organizations. Thus, moving from the dynamic capabilities perspective (Dosi et al., 1989; Prahalad and Hamel, 1990; Hayes and Wheelwright, 1984; Dierckx and Cool, 1989; Porter, 1990; Ghemawat, 1991; Chandler, 1992; Teece et al., 1997; Pisano 2000; Teece et al., 2000; Levinthal, 2000), in this work we propose to consider vicariance as a critical dynamic capability to survive in the changing, rubber landscape of the service economy.

As defined by Teece et al. (2000: 339), “dynamic capabilities are the ability to reconfigure, redirect, transform, and appropriately shape and integrate existing core competences with external resources and strategic and complementary assets to meet the challenges of a time-pressured, rapidly changing Schumpeterian world of competition and imitation. Dynamic capabilities thus reflect an organization’s ability to achieve new and innovative forms of competitive advantage despite path dependence and core rigidities in the firm’s organizational and technological process”. This definition underlines that a dynamic capability modifies, renews and reconfigures strategies and knowledge. In a broader sense, dynamic capabilities can be conceived as an ability that allows individuals, groups, firms and societies to overcome their inertia (path dependence) and to change over time, creating new skills, new knowledge, new way to do things. In an unpredictable environment, such as that of service economy, there is value in the ability to sense the need to reconfigure the organizational capabilities endowment, and to accomplish the necessary internal and external transformation (Amit and Schoemaker, 1993; Langlois, 1994). This requires the constant willingness to learn best practices from customers, suppliers, partners, competitors (benchmarking) and also the constant attitude to reconfigure and transform itself. These meta-capabilities, however, are quite difficult to train, as Teece et al. (2000: 354) remind us, “dynamic capabilities cannot easily be bought; they must be built. From the capabilities perspectives, strategy involves choosing among and committing to long –term paths or trajectories of competence development”. In other words, the maturation of a dynamic capability finds a concrete obstacle in the natural tendency of organizations to inertia (an indispensable moment in the analysis of competitive advantage in complex environment). This is expressly stated by Teece et al. (1997), who consider inertial factors (path dependencies) as fundamental in a dynamic capability-based approach to organizations. For this reason (and at the same time), dynamic capabilities perspective recognizes the importance of history. According to this approach, in fact, firms past investments and routine repertoire (“history”) constrain their future behavior. This happens because learning (and learning opportunities) tends to be “local” that is close to firms current activities (Teece et al., 1997: 523). To give an example, learning and research processes, especially if fast, tend to increase the reliability of the technological trajectory where the organization has already stored knowledge. Consequently, the tension towards the exploration of new trajectories is

weakened (Tab. 1). Dynamic capability, therefore, is referred to a meta-capability that allows the company to overcome its inertia and to change its competencies over time (Malerba, 2000: 177), creating new forms of competitive advantage.

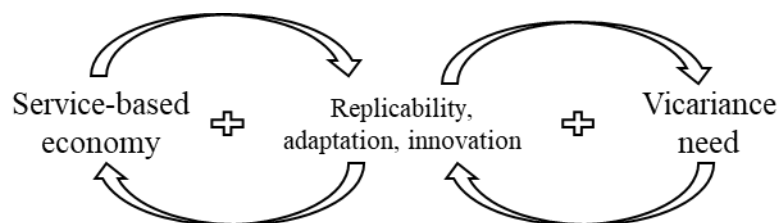
Table 1- Salient characteristics of Dynamic capabilities perspective

<i>Salient characteristics</i>	<i>Dynamic capabilities perspective</i>
Environment	Complex environment
Intellectual roots	Schumpeter, Nelson, Winter, Teece
Representative authors	Dosi, Teece and Winter (1989); Prahalad and Hamel (1990); Hayes and Wheelwright (1984); Dierickx and Cool (1989); Porter (1990); Ghemawat (1991).
Fundamental units of analysis	Process, positions, paths
Short-run capacity for strategic re-orientation	Low
Demand	Unpredictable
Role of industrial structure	Endogenous
Industry structure	Instable
Relative importance of managerial resources	High
Focus	Replicability, adaptation and innovation
Needed capabilities	Functional, integrative/of coordination, of learning, of reconfiguration and transformation

Source: Adapted from McWilliams and Smart (1995) and Teece et al. (2000)

Recombination, transformation, learning, avoiding inertia, are strictly related to vicariance. As we argued at the beginning of this section, vicariance contributes to the evolution of what Ashby (1956) called the “information variety endowment” of an individual, of a team or of an organization. So, for these reasons, we propose that vicariance is a crucial dynamic capability to survive in the rubber landscape of the service economy. Moreover, the more the economic systems become service-based, the more individuals and organizations face the challenge of flexibility, the more individuals and organizations need vicariance. And *viceversa*, according to an endless positive feedback (Fig. 2).

Figure 2. The positive feedback among service economy and vicariance need



Source: our elaboration

Change, however, is costly and so organizations must be aware of the professional services that can support them to minimize low pay-off change. Also, they must be aware of the specific challenges through which professional service can effectively support them.

Aiming to promote this awareness, the follow of this work focuses on the attitude of the Project Management (PM) to provide dynamic capabilities. According to this perspective, PM is a *vicarious that provides vicariance*: it is, at the same time, *vicarious* (in the sense of substitute) and *provider of vicariance* (meant as provider of a consistent bundle of dynamic capabilities). Starting from the premise that service is the provision of values and knowledge by one party for the benefit of another, in the following we refer to PM as a flow of services based on a wide and shared endowment of ethical code, codified knowledge, technical tools and experiences supporting heterogeneous value co-creation processes.

### **3. Providing vicariance in the service economy: the role of project management**

The world of operations is conceived to handle the routine; it is based on recursive, high standardized processes with the aim to ensure and replicate high standardized, stable and repetitive results. On the contrary, PM provides flow of knowledge-based services that is not usually used in the operations management processes. So, the main aim of PM is to effectively and efficiently enabling unique, not replicable/standardized outputs. To enable the adaptation of the PM processes to heterogeneous projects, it is necessary to use an incremental, iterative and adaptive approach. In this way, the performing organization that exploits the PM bundle of processes achieves the necessary flexibility and resilience to the context in which the project is realized. Nowadays, PM is gaining increasing attention not only in its familiar industries. It is more and more exploited as an effective set of capabilities to lead any kind of project, including innovation and organizational change that are in turn more and more diffuse in the service economy. The growing diffusion of PM is strictly related to a new way of conceiving the projects that is emerging in the service society. Projects play an important role in our society. They are not only the typical core of enterprises such as design, plant engineering, engineering, consulting, etc.; but projects increasingly attract the attention in the public and non-profit sectors. Over the last twenty years, a lot of attention has been given to the management of processes for the development of new goods and services in an increasingly rapid and cost-effective manner (High Speed Management). Above all, nowadays projects are interpreted as a strategic vehicle for the development of any kind of organization.

After describing PM as a consistent flow of professional services, the following of this Section describes the approach through which PM can provide vicariance in the rubber landscape of service economy.

#### *3.1. Project management as a systemic flow of services: definition, aims and core processes*

As managerial literature underlines (Zangrandi and Borgonovi, 1990; Archibald, 1997; Manzoni, 1998; Simone et al., 2014), Project Management (PM) configures a wide, consistent and systemic bundle of principles, rules, capabilities and tools that has continuously evolved over time and across different industries, organizations and countries, both at academic and at practical level. The PM discipline, from the military environment of post World War II, has quickly spread in managerial field due to its ability to pursue high levels of efficiency and effectiveness, synergically organizing the phases of planning, coordination and control. PM is a result-oriented technique to handle unique, complex and long-term oriented projects, by decomposing a final goal into single objectives and delegating their achievement to individuals or groups with different attitudes and competencies (Ricciuti, 2003). Project Management is, therefore, “aimed at achieving a clear and predefined goal through a continuous process of planning and control of resources, under interdependent cost-time-

quality constraints" (Archibald, 1997). Its historical evolution has transformed a methodology into a true managerial philosophy and also has radically changed the role of project managers, from that of project coordinators to that of real entrepreneurs. Project managers, in fact, have to combine day-by-day control capabilities, to ensure the viability of the project, with broader qualities (e.g. leadership), to reach consensus within their teams and create a collective value which is higher than the sum of single members' value (Kharbanda & Stallworthy, 2004). Project managers represent the blend of technical, managerial and relational skills with political abilities, essential to overcome and to compensate the lack of formal authority that affects this position. Projects, therefore, are strategic vehicles for the growth of any kind of organization: the constant variability in market parameters, the high-rate change of the environment, the constantly shrinking time-to-market (Bianchi et al., 1996), the even shorter life cycle of products and services, in fact, impose on firms and societies to be proactive and able to rapidly and creatively read the dynamics of the context. This evolutionary dynamic is summarized in the description of project life cycle (Ricciuti, 2003)<sup>1</sup>.

In the service economy environment, PM represents a bundle of professional services to support the performing organization: it is an intangible flow of professional knowledge, enabling performing organizations to manage their projects more efficiently and effectively. This professional knowledge endowment is constantly evolving in a close relation to the external and internal context within which the different projects are leaded.

PM identifies a flow of management, coordination, planning and control services as well as an intangible endowment of cultural values and best practices. Project Management plays a critical role enabling knowledge exchange, knowledge integration, knowledge sharing and knowledge exploitation, both inside the organization and among organizations in the external environment. It support the fit among organizational processes and environmental constraints and opportunities, in order to create optimal emerging solutions. Project management services are, thus, useful in all the phases of a project, from the initial concept through implementation, until the final commissioning and handover (PEO). Usually PM services include conceptual studies and feasibility, policy and procedure, planning and scheduling, budgeting and estimating, design management, cost control, reporting and procurement. According to the Association PEO's guidelines (1991), it is possible to describe each of these services as follow (table 2).

*Table 2. The flow of services provided by PM*

Service	Main processes
<i>Conceptual studies and feasibility</i>	In the conceptual phase of a new project, prior to the performing organization's decision to proceed, the project manager must give assistance in order to verify the feasibility of the project in terms of achieving the project objectives while respecting constraints. At this stage, the project manager can also arrange for conceptual studies to be carried out together with the preparation of preliminary schedules and preliminary budgets for the scope that is identified. These budgets would have a confidence level based on the level of accuracy of information provided, and would be identified to the performing organization as such.
<i>Policies and procedures</i>	Effective management of a project calls for the early establishment of policies and procedures for its implementation. During the initial phase of the project, therefore, the project manager,

<sup>1</sup> Ricciuti (2003) provides an example of PM lifecycle, suitable for any type of project, and composed of five phases:

- concept and definition: the idea-project is defined and objectives, constraints and technical and economic feasibility are identified;
- setting: the project is analyzed and planned in terms of time, cost and quality;
- development: planned activities are carried out to achieve the project realization. It is fundamental the phase of reporting;
- exercise or starting: the project output is in condition to operate or to be executed;
- post-completion: the output is handled and maintained.

	<p>in conjunction with the key stakeholder, would establish clearly defined and properly documented project policies and procedures that meet the client's operational requirements and satisfy the needs of effective management and accountability. The project policies and procedures would be specifically developed to suit the size, complexity and scope of the particular performing organization's need.</p>
<i>Time management</i>	<p>Time management is one of the key functions of managing a project. A failure to achieve time objectives normally adversely affects the project costs, and the client's anticipated benefits/revenues from the project and can also result in consequential costs. There are usually four separately identifiable steps in managing the time in a project: planning, scheduling, monitoring and control. Within the time management, the project manager would select the most appropriate scheduling technique in relation to the size, complexity and risk of the project and would identify key dates. When complete, the schedule represents the basis for schedule monitoring and variance reporting can be established</p>
<i>Budgeting and estimating</i>	<p>Budgeting is the process of establishing, at an early stage, an estimated project cost (budget) that is acceptable for a specific project scope of work to be performed in a specified time and quality framework, and against which the project can be continuously monitored. During the project planning, the project manager would prepare a cost estimates. In general, the accuracy of the project cost estimate would be expected to improve as the project proceeds. It is important, therefore, that the degree of accuracy and the information on which the cost estimate was based be included in estimate submissions. Other items that need to be clarified and defined, as necessary, in finalizing an estimate include escalation, contingency, interest and other financing costs. The amounts for these items would be clearly indicated together with the basis on which they were calculated. In order that the client has a full appreciation and understanding of the estimate, the project manager would normally advise the client of all different cost type identified for the project. Alternatives and trade-offs may be discussed in defining the exact scope of the project. If and when the performing organization approves this initial cost estimate, this then becomes the approved project budget from which all subsequent costs and forecasts can be monitored and controlled. As necessary, estimates of cost and cash flow would be prepared for subsequent monitoring and for assisting in arranging project financing. As the project proceeds, any changes in scope would be referenced to the approved project budget and, in order to be aware of the implications of changes in scope, approved scope changes would be fully documented in regard to definition, cost and schedule.</p>
<i>Design management</i>	<p>Design management is the process of monitoring and controlling the design function to determine whether the design is being carried out within the constraints of the project's scope, schedule and budget, to initiate any corrective action required and to advise all the key stakeholder accordingly. It is important to monitor closely the output of design to determine whether the design budget and overall project budget are being adhered to. The project manager would determine whether the consultant is obtaining the necessary input from regulatory bodies, insurers, municipalities, etc., as well as reviewing and assessing user requirements to ensure that such requirements adhere to the project budget and performance standards, would initiate any corrective action required, and would advise the performing organization accordingly. In order to promote the meeting of the overall project schedule, the design function itself would be scheduled and monitored.</p>
<i>Cost control</i>	<p>Cost control is the process of reporting, monitoring, analyzing and controlling commitments and resulting expenditures (costs) together with the initiation of the necessary present and future action to achieve the budget objectives on a project. In order for cost control to be effective it should commence at the inception of a project and should proceed through the various phases of the project. The project manager would generally be responsible for overall control of costs against the approved budget and would establish the necessary procedures to permit the utilization of appropriate business management methods to control expenditures and to provide the key stakeholder with accurate and timely cost information on the project. The extent and degree of cost control that can be achieved will vary with the type of contract that applies in a particular situation and the stage to which the project has progressed.</p>
<i>Reporting</i>	<p>In order that the project stakeholder can be kept informed of the status of a project, the project manager would implement a program of regular reporting. Reports would be prepared on a regular, scheduled basis and would provide timely up-to-date information on all critical aspects of the project such that all necessary decisions or actions can be taken promptly. The type, content and format of reports would be established to suit the nature of the project and the stakeholder's requirements and would normally include information on the topic to the extent that they are applicable to the particular project: general project status; progress</p>



	<p>compared with schedule, including variances, explanations and possible schedule adjustments; costs and commitments compared with budget including estimated cost at completion, variances, explanations and possible corrective action where required; status of activities of consultants, including status of design and design changes; procurement activity, including materials/equipment delivery status; permits, agreements and contract status; deliverable implementation status; commission status.</p>
<i>Procurement</i>	<p>Procurement is the systematic execution of the procedure for purchasing all materials, equipment and services needed for the project, in good time, and in a manner which is cost-effective. These would generally include (but may not be limited to) those provided by consultants, testing services, suppliers and contractors. The project manager would normally address the following aspects:</p> <ul style="list-style-type: none"> <li>- procurement criteria and procedures based on good commercial practice and on agreement with the client;</li> <li>- interaction between the project schedule and procurement activities;</li> <li>- agreement with the client on signing authority, including requisitioning;</li> <li>- prequalification of suppliers of goods and services including sourcing, availability and market climate;</li> <li>- implementation of an appropriate materials management and control system;</li> <li>- appropriate documents for calling for tenders or proposals including input on such aspects as packaging, shipping methods, currency and terms of payment, treatment of taxes, freight, duties, customs clearance, insurance, responsibility for changes in taxes, exchange rates, etc., spare parts and after-sales service and guarantees;</li> <li>- issuance, receipt and assessment of tenders or proposals including negotiation and comparison of bids/proposals with each other and with the budget;</li> <li>- appropriate documentation for purchase orders and contracts;</li> <li>- verification of materials and equipment received.</li> </ul>

Source: our elaboration from PEO (1991)

*3.2 The Project Management approach to provide vicariance*

Vicariance refers to the progressive replacement of relations and interactions between the external and the internal components of an organization, in order to activate processes that allow to innovate and wide the possible paths of the organization, without losing the organizational balance.

As we saw in Section 2, vicariance can be defined as the supersede of a process by another process leading to the same result. For this reason, it is a fundamental capability for project teams, as it offers the powerful ability to create, innovate and interact with others in a flexible and creative way. The concept of vicariance must be associated with the context: each project team constructs worlds and meanings according to their culture, values, knowledge, skills. Vicariance is a simplexity (Berthoz, 2009) capability, a bifurcation (Prigogine and Stengers 1984), a creative deviation from the previous extant path. So it creates variety. And variety concerns a fundamental property of the human beings, that of problem solving by overcoming rigid constraints of procedures, to find creative possible solutions. The vicariance is implicit in the relationship between the universal and the particular, and especially in the project management, represents the conflict between the goals actually achieved and those set at the beginning. It can be also defined as the capability of complex systems – and projects are complex systems - to exploit their environment in a very different way. The ability to imagine an act, a solution, a scenario, using mental simulation, using a double of ourselves, is a very original form of vicariance. History is fundamental to create future scenarios and to choose vicarious solutions. Vicariance is leaded by the projection towards the future and it allows to change perspective, “viewpoint”, a way for creativity. The PM allows to change views or perspectives to find alternative solutions to a problem. To choose among different solutions that lead to the same goal, the team needs to make decisions. To make a decision means to choose between several solutions that lead to the same final result. Decision-making therefore belongs to the category of vicarious processes. In day-by-day management of projects, project

teams play in rubber landscapes. In a rubber landscape vicariance is the capability to imagine potentially effective behavior consistent with the team’s constraints and aims. The project management is a vicarious provider of information variety, knowledge and managerial capabilities to co-create value by exploiting the known or by exploring the unknown. In the service economy, the project management is a service of excellence characterized by the application of knowledge, skills, tools and techniques, a code of ethics and professional conduct, and a heritage of specific, recognized and shared culture and experience. The project management plays a vicarious role in terms of management skills and cultural approaches, integrating the organizational process assets. This vicarious role provides a multi-perspective on problem solving, increasing the range of options by combining information variety and organizational process assets. Information variety, in fact, would be useless, if it were not exploited to adapt and transform the organization. The following table 3 describes the role of PM as vicar, linking its fundamental flow of services to the main vicariance dimensions. On the other hand, the following table 4 focuses on the attitude of PM to provide dynamic capabilities. In this perspective, PM is also a *vicar that provides vicariance*, as to say a provider of a consistent bundle of dynamic capabilities.

Table 3. The PM services-vicariance matrix

		VICARIANCE DIMENSION			
		<i>Functional vicariance</i>	<i>Vicariance of use</i>	<i>Transformational vicariance</i>	<i>Flexible adaptation and learning through factors of inter-individual variability in context</i>
PM FLOW OF SERVICES	<i>Conceptual studies and feasibility</i>	Constraints management	Context analysis	General planning and general risks analysis	Stakeholder analysis
	<i>Policies and procedures</i>	-	-	Constraints management and SWOT analysis	-
	<i>Time management</i>	Time planning	-	Time planning, time control and time forecasts	Time planning, time control and lessons learned
	<i>Budgeting and estimating</i>	Cost planning	-	Cost planning	Cost planning and lessons learned
	<i>Design management</i>	Scope planning	Scope control	Scope control	-
	<i>Cost control</i>	Cost control and Cost performance analysis	-	Cost forecast	Cost Control and lessons learned
	<i>Reporting</i>	-	Stakeholder management	Stakeholder management	Stakeholder management and lessons learned
	<i>Procurement</i>	Procurement	-	-	Lessons learned

Source: our elaboration

Table 4. Project manager as vicariance provider: organizational dimensions and service economy challenges

Critical organizational dimension	Service economy challenges	Vicariance typology required to the project manager
<i>Functional integration and coordination</i>	<i>Increasing need for bridge capabilities.</i> Providing boundary-crossing capabilities that allow or strongly support connections/links of various kinds: links between heterogeneous specialized knowledge (vertical knowledge), links between problems requiring solutions and solutions in need of problems and links between people who have different cognitive frames because they live or work separated by geographical, organizational, hierarchical, or cultural boundaries (Barile et al., 2015). That is, this challenge involves ‘bridge capabilities’, which play a crucial <i>synapse role</i> in continuous learning and innovation, which are the key processes to survive in a service economy.	<i>Vicariance of use / Transformational vicariance</i>
<i>HRM</i>	<i>Increasing need for neghentropic human resources.</i> People can no longer be seen as elements of unpredictability to be normalized; instead, they should be viewed (taking as a metaphor the dissipative structures of Ilya Prigogine’s Nobel Prize for Physics) as true neghentropic or, better, syntrophic resources that are able to generate connections between ideas, organizations, countries, cultures, and scientific fields and to widen the range of strategic alternatives. This vision of people as syntrophic resources encourages the adoption of a distributed logic in the design of operative structures. Creating the necessary conditions to transform the whole set of individuals (understood as sum of individuals) into a team whose distinctive characteristic lies in the rise of synergies capable to create collective value and meta-competencies. The project manager has to realize a continuous trade-off between management skills and leadership skills, privileging the latter in the changing management phases or in innovation projects.	<i>Functional and transformational vicariance</i>
<i>Relationship among vertical and horizontal dimension</i>	<i>Increasing stress on the horizontal organizational dimension</i> (Barile et al. 2017). The increasing diffusion of projects leads to a crescent tension between the vertical functional dimension to the horizontal dimension of the projects, resulting in an imbalance in favor of the latter. The project manager is the most involved figure in finding solutions to effectively manage this tension.	<i>Transformational vicariance</i>
<i>Quality management</i>	<i>Ensuring quality in a service society.</i> While closed and hyperdetermined tangible economy leads to the hiding of problems, service economy fosters a continuous increase of quality. Service economy, in fact, is based on a strongly decentralized use of knowledge which, compared to the hypothesis of a centralized use of knowledge (von Hayek, 1945), allows society as a whole to be more efficient, but also to be more creative, because of the interaction of redundancy that leverage the information variety (Ashby, 1956) available in the organization. The dysfunction of a single organization can be overcome through the compensation of the PM.	<i>Transformational vicariance</i>
<i>Relationship among managerial and entrepreneurial function</i>	<i>Ask for an entrepreneurial role of project manager.</i> Shifting from managerial to entrepreneurial role: the PM historical evolution has transformed a methodology into a true managerial philosophy and also has radically changed the role of project managers, from that of project coordinators to that of real project entrepreneurs (Ricciuti, 2003).	<i>Transformational vicariance</i>

<p><i>Learning</i></p>	<p><i>Increasing need to “learn to learn”</i>. Project manager is asked to play as knowledge fertilizer and knowledge broker (Hargadon, 1998; Hargadon and Sutton, 2000; Billington and Davidson, 2010). PM needs to be rooted in the will to overcome the barriers between disciplines according to an open, multi-logical and multi-perspective approach to human knowledge. PM should provide “learn to learn capabilities” such as finding solutions to a problem, also in different disciplinary fields far from those in which the problem has been formulated. In the future, PM should be conceived as an open bundle of systemic principles, rules and competences able to move along endless paths of investigation, asymptotic and therefore capable of surprise.</p>	<p><i>Vicariance of use / Functional vicariance</i></p>
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Source: our elaboration

#### 4. Conclusion

The rubber landscape of service economy increasingly asks for dynamic capabilities.

Rooting in the dynamic capabilities perspective, in the biology and in the neuroscience, the paper aims to enlighten the role of Project Management and on project managers in providing to organizations a specific dynamic capability: vicariance. Vicariance means not only to provide a substitute, instead it also means dynamic capability to create, to invent, to innovate. By applying the concept of “vicariance” to PM, the paper sheds new light on the PM and on project managers as vicarious providers of additional, complementary information variety, knowledge and managerial capabilities to co-create value by exploiting the known or by exploring the unknown. In so doing, PM is a vicarious able to widen the range of strategic and organizational options to manage the emergent challenges that organizations face in the rubber (complex) environment of service economy. This way to conceive the PM is original and it leads to new insights on the professional services management. In fact, on one hand, dynamic capabilities cannot easily be bought through a market transaction (Teece et al., 2000); on the other hand, they must be built. This building can be achieved internally, by the organization itself (i.e. hierarchy), or through a partnership (i.e. hybrid form among hierarchy and market) (Williamson, 1991). Project management professional services enrich organizations with additional information variety according to a hybrid (i.e. non- market) coordination model.

This interaction promotes potential knowledge creation by combining different information variety endowments and it allows teams and organizations to generate connections and to explore and exploit additional knowledge. In so doing, Project Management provides vicariance attitude, enriching the number of options available and maintaining or improving organization’s ability to survive in a rubber landscape.

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