Mind the Gap: Adapting and Reorienting Organizational Architectures

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Mind the Gap:  
Adapting and Reorienting Organizational Architectures

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The study of organizational architecture builds upon the analysis of the different answers provided by organizations to increase the fit with their external environment. Investigating such theme, scholars emphasize the evolutionary nature of organizations in terms of adaptation, flexibility, evolution and decomposability: organizations combine and recombine elements that compose their architecture, modifying them in a number of different ways. In the present work we examine how organizations modify their architecture in response to environmental feedback, measured in terms of performance gap. In a study of 755 organizations, we find that, depending on the presence of a performance gap, organizations decide whether to maintain their current architecture or to modify it. Interestingly, the extension of the performance gap affects the magnitude of organizational architectural change: on the basis of the extension of the performance gap, organizations will implement either minor or major modifications in their architecture.

Keywords: organizational change; adaptation; reorientation; performance gap.
1. Introduction

Organizations are in a continuous search to increase the fit with their external environment. In this search, they combine and recombine elements that compose their architectures, modifying them in a number of different ways (Lawrence & Lorsch, 1986; Milgrom & Roberts, 1995; Siggelkow, 2002; Zott & Amit, 2008). Evaluating their performance in comparison with the external context, organizations process information obtaining feedback on their behavior (Greve, 1998). Several studies have highlighted the importance of environmental feedback as a key driver of organizational change although each organization finds a unique way to address external stimuli (Bensaou & Venkatraman, 1995; Ceci & Masini, 2011; Dennis & Meredith, 2000). The existence of a link between environmental feedback and organizational change is widely accepted but scale and scope of organizational changes are partially unknown. In order to fill this gap, this paper explores how organizations modify their architecture in response to environmental feedback.

It is known that organizations are adverse towards risk (Greve, 1998; Greve & Taylor, 2000), but they reduce aversion when they fail to reach goals or aspirations (Greve, 1998). In defining their aspirations, organizations are conditioned by the performance obtained in their past experiences and by the performance of similar organizations. The higher the gap with the past performance or with the performance of similar organizations, the lower will be their aversion toward risk (Grinyer & Mckiernan, 1990; Kahneman & Tversky, 1979; Vissa, Greve, & Chen, 2010). The existence of such gaps fosters organizations to undertake architectural changes by selecting one of the following strategies: (i) playing the old game, i.e. the organization does not change anything, keeping its old configuration; (ii) playing an incomplete game, i.e. the organization changes single elements in its system; (iii) playing a new game, i.e. the organization changes a whole range of its elements (Siggelkow, 2001).

The following examples illustrate the implications of such decisional process. To explain the incomplete game situation, Siggelkow (2001) reports the case of the American automobile industry that observed a gap with the performance of their Japanese competitors. By copying only a few elements of the Japanese production system, the American automobile industry played an incomplete game for many years (Hayes & Iuikumar, 1988; Siggelkow, 2001: 842). One of the most famous cases of successful “playing a new game” strategy is the transition
toward services operated by IBM at the beginning of the 90s. To face the increasing competition and losses in revenues, the CEO Louis Gerstner imposed changes in strategy, including international dimension, role of IT and new technologies and in the internal configurations such as behavioral and cultural aspects. Every aspect of the old architecture has been modified and the result was a completely different company (Bramante, Frank, & Dolan, 2010; Gerstner, 2002; Lichtenthal & Copulsky, 1993). Undertaking such restructuring is undoubtedly painful and risky for the organization. So far, it is not clear what are the forces that push organizations towards such uncertain path. This paper addresses this issue refining and extending our comprehension of organizational change. We draw upon insights from prior studies that have examined the concept of organizational architecture (Gulati & Puranam, 2009; Mendelson, 2000) and studies on performance gap (Greve, 1998). From studies on organizational architecture, we construct an original measure of organizational architecture while from studies on performance, we infer how organizations define their aspirational levels.

Empirically, this paper uses an original database obtained by merging two datasets: data are based on two waves of a large survey conducted by Unicredit, an Italian bank group. Results show that when performance feedback presents a minor gap to be filled, organizations are likely to implement minor changes to their architecture. On the contrary, organizations implement major modifications to overcome a large performance gap. In these two cases (i.e. minor and major gap), scale and scope of change differ and a discrete model, where modifications of organizational architecture are not seen in a continuum, is more appropriate in describing organization’s decisions.

2. Theoretical background

2.1. Understanding organizational architecture

Organizations are complex systems, which include several interrelated elements: they perform complex tasks that cannot be carried out by a fully integral, entirely interdependent organization. To successfully operate in markets, organizations decompose those tasks generating an organizational structure composed by different elements. Based on this reasoning, many scholars consider organizations as an architecture of different elements and they explore their structure focusing on their evolutionary nature in terms of adaptation, flexibility, evolution
and decomposability, as articulated by Simon (1969) (Dosi & Grazzi, 2006; Ethiraj & Levinthal, 2004; Fixson & Park, 2008; Jacobides, 2006; Mendelson, 2000).

Makadok (2001) suggested that elements that compose organizational architecture should be unique, imperfectly imitable, and aimed to improve the productivity of organizations. Relying on the contingency approach, we regard as true the idea that superior performance can be achieved only when elements of organizational architecture are combined coherently to match the characteristics of the environment in which organization operates (Drazin & Van De Ven, 1985; Duncan, 1972; Venkatraman, 1989). Organizational architecture is composed by the interplay between organizational elements and changes in organizational architecture are determined by a modification in its elements.

Our understanding of organizational architecture builds on the works done by Gulati and Puranam (2009) and by Mendelson (2000). In fact, Mendelson (2000) identified a set of core elements of organizational architecture looking at how information is processed and distributed within the organization. By defining organization as an information-processing system that assimilates information from the external context and match it with internal information, he proposed an organizational architecture based on information awareness. Consistently with Mendelson (2000), this study define organizational architecture decomposing organizations in a set of architectural elements taking into account how information and knowledge are transferred and processed within the organization. On the other hand, Gulati and Puranam (2009) explored organizational architecture focusing on changes between formal organization – i.e. the normative social system design by managers – and informal organization – i.e. the patterns of social interaction that emerge within an organization. In line with Gulati and Puranam (2009), we look at organizational architecture in terms of combination of organization’s choices. However, differently from Gulati and Puranam (2009), who emphasized the duality between formal and informal organization, we focus on formal organization elements. Differently from the informal organization elements, the formal ones can be changed relatively rapidly (Lamont, Williams, & Hoffman, 1994). This enables to explore how organization responds to environmental changes in the short term.

2.2. Organizational change, environmental feedback and external fit

Organization theory provides different perspectives to organizational change. In particular, population ecologists emphasized upon peremptory environmental determinism (e.g. Hannah &
Freeman, 1984): building on Stinchcombe (1965), Hannan and Freeman (1984) claim that organizations are often inert for different attrition forces. Those attrition forces include the cognitive lock-in produced by the initial mode of operating or imprinting and by the lack of search for information on relevant contingencies to which it may be worth to adapt. Informed by contingency theory ideas, Zajac et al. (2000) and Siggelkow (2001) discuss the effectiveness of organizational change. From these studies it is possible to capture the idea that a straightforward application of contingency theory contemplates the possibility of a beneficial inertia, or stability. When environmental contingencies change, organizations should modify accordingly, but when the environmental contingencies are relatively stable, it might be convenient for the organizations to stay stable as well (McCarthy, Lawrence, Wixted, & Gordon, 2010). This suggests, as logical consequence, that, under some circumstances, organizational stability can be beneficial (Tushman & Romanelli, 1985). Prencipe and Grandori (2008: 235) name this organizational behavior “contingently effective invariance”, arguing that the reasons for stability is not the continuation of a state, but the absence in the organizations’ environment of threats that are contingently effective. On the contrary, when the organizations perceive the presence of threats in the environment they are likely to develop a new definition of the internal configuration that could ensure the permanence of external fit (Siggelkow, 2001). Therefore, the decision to change the organizational architecture is highly influenced by the perception of possible threats in the organizations’ environment.

Referring to the stream of literature that has supported the importance of cognition in explaining organizational stability (Garud & Rappa, 1994), we draw some insights on how to specify threats we expect determine an organizational change. Managers are bounded rational and rely on simplified representations of the world to process information (March, Guetzkow, & Simon, 1958; March, 1988; Simon, 1955). Cognitive representations are considered relevant to explain the organizational behavior, and ultimately, the propensity to change (Tripsas & Gavetti, 2000). The borderline between perceived success and failure is called “aspiration level” (Greve, 1998; Lopes, 1987; Schneider, 1992). An aspiration level has been described as a “reference point that is psychologically neutral” (Kameda & Davis, 1990: 56) or as "the smallest outcome that would be deemed satisfactory by the decision maker" (Schneider, 1992: 1053). Kiesler and Sproull (1982) explain that cognitive representations are typically based on historical experience as opposed to current situation. This suggests that aspiration levels depend on organizational
history and the attention patterns of their members.

Greve (1998) suggests that organizations process environmental feedback by comparing their performance with the performance of other organizations operating in the same industry and by comparing their current performance with their past performance. Therefore, organizations use two aspiration levels: the social aspiration level, which is obtained from a comparison with competitors; and a historical aspiration level, which is obtained from a comparison with the organization past performance (Cyert & March, 1963; Wood, 1989).

Organizations, as individuals, are provided to be averse to risk since risk choices put them in front of many possible unpredictable outcomes and pose the treat of very poor outcomes. Organizations appear resistant to change, but, in some circumstances, they modify into forms remarkably different from the original. As pointed out by Greve (1998), organizations reduce their aversion towards risk when they fail to reach their goal or aspiration. The underlying process is one in which the organization is conditioned through the performance obtained in the past experiential learning (Day & Groves, 1975) and through the performance of similar organizations. The social comparison theory suggests that aspiration level are related to the comparison with the performance of similar others (Cyert & March, 1963; Festinger, 1954). As individuals, organizations do not evaluate their abilities by comparison with others who are too divergent from them. If other’s abilities are too far, either above or below, it is not possible to evaluate organizations’ abilities accurately with comparisons with them. Consequently, the organization will chose for comparison other organizations that present similar characteristics. Also, theory on aspiration analyzes the performance history of the organization itself (Cyert & March, 1963; Greve, 2002; Levinthal & March, 1993), comparing the current level of performance with the previous ones. Environmental feedback is, therefore, processed by the organizations in terms of performance gap with their aspirational levels.

3. Hypotheses development

Organizations align and re-align their architectures to the environment: we posit that organizations process environmental feedback by defining an aspirational level that is obtained by comparing the current level of performance with (a) previous performance and (b) performance of organizations operating in the same industry (Cyert & March, 1963). We expect changes in organizational architecture be influenced by the organization’s position in relation to
those two aspiration levels. When the organization perceives the presence of a gap between its performance and social and historical aspirational level implements change in its organizational architecture. This leads to Hypothesis 1:

\textit{Hypothesis 1: the presence of a performance gap increases the likelihood that the organization will modify its architecture.}

As argued above, as long as the organization environment does not present any threats, stability is found to be beneficial (Tushman & Romanelli, 1985). However, when organizations perceive the presence of threats in their environments, stability becomes a liability (Siggelkow, 2001). Organizations need to maintain co-alignment with changing contingencies in their environments (Kraatz & Zajac, 2001). Building on literature on individual and organizational risk taking, Greve (1998) explains that the organizations’ decision to undertake strategies that involves a high degree of risk depends on the context of the choice (Lopes, 1987; Thaler & Johnson, 1990). In any organizational context, managers take fewer risks when performance exceeds their goals (Singh, 1986). On the contrary, high organizational risk taking is related to low performance relative to aspirations (Bowman, 1982; Bromiley, 1991; Grinyer & Mckiernan, 1990). Managers are available to assume the risk of change when they perceive the presence of a performance gap (Chattopadhyay, Glick, & Huber, 2001). Therefore, we can identify three different situations, according to the extension of the performance gap highlighted by the organizations.

The decision process that organizations follow when implementing organizational architectural changes is articulated in two steps: (i) the organization decides whether to change its organizational architecture or not, adopting ongoing changes to its organizational architectural elements; (ii) the organization decide whether to adopt minor or major changes to its organizational architecture. In the first case both social and historical aspirational levels are in line with the organization’s actual performance. Ongoing changes are applied to single organization architectural elements and the scale of change is very low. Their scope is to adjust the organization architectural elements to make them evolve with the naturally occurring environmental changes (Feldman, 2000; Tsoukas & Chia, 2002). An empirical example is
represented by the upgrade of ICT architecture that must be periodically revised to be up-to-date with the technological innovation occurring in the field. In the second case, we can detect a misalignment with aspirational levels, i.e. social or historical levels are not in line with organization performance: in such situations, organizations are asked to fit the gap and the extent of the change is proportioned with the dimension of the gap, as we explain as follows.

3.1. Adaptation strategy

In the case of a partial misalignment with aspirational levels either social or historical level is not in line with organization performance. The limited performance gap makes the expected outcomes generally good and, in line with the previous reasoning, managers are risk adverse. The scale of changes is low and it includes few organizational elements. In such situations, organizations tend to imitate other companies in their comparison group or to compare their organizational choices with their past experience. This reduces the riskiness associated with changes and it legitimate organizations to imitate the prevalent behavior. This is a way to resolve uncertainty and gaining legitimacy; the imitation of organizational structures is driven by norms of rationality (Meyer & Rowan, 1977) and uncertainty (Di Maggio & Powell, 1983). However, unusual and innovative practices are rarely adopted (Massini, Lewin, & Greve, 2005). The scope is to solve a locally sourced problem; e.g. decreasing the cost of production trough the use of offshoring. We observe actions aiming at modify the structure of a single architectural element, as the international dimension in the cited example. These actions respond to the need of solving a problem that involves a limited number of actor and not the whole organization. The search for a local solution is preferred due to lower risks associated with it. In fact, risks connected with the adjustment procedure are generally lower and this path is selected by those organization that experienced small gaps between the effective performance and their aspirational level. An example of minor changes is the one of Daehan Steel, a Korean organization that undertook a business transformation project to enable the future growth of the company as "a total steel solution provider" (IBM, 2010). In this case, the organization aimed to fill the gap with competitors, not experiencing any major losses in its revenues, compared to the past. Daehan Steel implemented a complete modification of IT architecture (contract management system, standard cost management, supply chain management, operation system, ERP system, pricing strategy planning and diagnosis of Information Technology operations), required to facilitate the
growth of Daehan Steel not only in Korea but in the global marketplace. This line of reasoning leaves to our second hypothesis.

_Hypothesis 2: the presence of minor performance gap increases the likelihood that the organization will adapt to the environment through small architectural changes_

### 3.2. Reorientation strategy

Organizations may find themselves to deal with a misalignment of both social and historical aspirational levels. Those organizations that experience a major gap in their performance do lose competitive grounds in relation with peers and with their own past performance. To fill the gap, organizations are called to pursue major modifications in their architecture that imply higher risk (March & Shapira, 1387). This is consistent with Yasai-Ardekani (1989) who argue that organizations respond to perceived environmental pressures by making structural changes. The scale of structural change is high since all the elements of organizational architecture are involved. The dimension of the gap suggests a misfit between external conditions and organizational architecture, and modification in one or two elements may not be sufficient to reach a new fit. In fact, adaptation to environmental changes may not be sufficient in order to provide the external fit. There is a need for providing different answers to the challenges of the competitive context: the scope of changes radically differs from the adaptation case.

An example of reorientation largely documented is the restructuration of Marks & Spencer: in 1998 the retailer began a downward spiral, having failed to keep pace with competitors by either expanding globally or developing niche markets (Beaver, 1999). The perceived gap with its historical performance and the competitors forced the new CEO to implement a restructuring plan. The new plan included decentralization of operations, restructuration of internal organization (a number of top-level management changes were made), a change in human resources policies, openness to new technologies (banking services – allow stores to accept credit cards for the first time in its history, IT and, few years later, e-commerce) and modifications in suppliers’ relation (cuts for the less effective parts of its UK supplier base to reduce prices). Additionally, M&S implemented a series of new initiatives: it began to advertise more
aggressively and to introduce more aggressive promotions and it decided to modify its value proposition, by offering better value for money and improved service, and by better display and presentation of merchandise (Davies, 1999; Grundy, 2005; Jackson & Sparks, 2005; Merriden, 2000; Rippin, 2005). Every element of the architecture has been modified in the turnaround. Coherently with the reasoning, we propose the following hypothesis:

**Hypothesis 3: organizations that experience major performance gap are likely to adopt large changes in their architecture; i.e. Reorientation**

Figure 1 summarizes the reasoning conducted so far and aims at exemplify the organizational architecture changes’ typologies that assume different characteristics according to the extension of the performance gap. The relation between (i) dimension of organizational architecture changes and (ii) environmental feedback is summarized in figure 2.

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Insert figures 1 and 2 about here
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4. Methods

4.1. The data

To address our research questions, we merge two waves of a large survey conducted by Unicredit, an Italian bank group. Data refer to the three years period 2001-2003 (first wave) and 2004-2006 (second wave). In each wave, a statistically significant sample of organizations has been selected. Unicredit realized a mixed type sample selection by disposing a sample survey for organizations from 11 to 500 employees and a census survey for organizations with more then 500 employees. The sample is representative of Italian manufacturing organizations. The samples have 80 layers made by 5 size classes, 4 macro areas, and 4 sectors. The response rate is the first wave was 28.5 %, while in the second wave was 25%. After deleting observations for which we have missing values in one or more variables, we obtain a sample of more then 800 organizations.
4.2. The research strategy

Our empirical strategy follows two steps. First, in an effort to measure a multidimensional concept, we conceptualize organizational architecture using a principal component analysis (PCA). The PCA enables us to find a proxy of the elements that define organizational architecture. Second, in order to understand the effect of performance feedback on different degree of organizational architecture changes, we conduct a logit and a nested logit regression analyses.

4.3. Operationalization of the dependent variable.

To identify the key elements that compose the organizational architecture, we follow Gulati and Puranam (2009) and Makadok (2002) and select formal architectural elements that are unique, imperfectly imitable, and that aim to improve the productivity of the organization. Accordingly, we choose those elements that offer a comprehensive approach to organization characteristics including information, knowledge and hierarchical structure. Based on this reasoning, we articulate organizational architecture in four dimensions: (1) human capital element of organizational architecture; (2) international element of organizational architecture; (3) ICT element of organizational architecture; (4) hierarchical element of organizational architecture.

The human capital element of organizational architecture captures the presence of qualified workers and their involvement in knowledge intensive and R&D activities. Organizations’ investments in knowledge intensive and R&D activities are appreciated for the potential in augmenting the existing stock of internal knowledge (Cohen & Levinthal, 1990; Masciarelli, 2011). Moreover, employees’ skills and capabilities contribute to define the core capabilities of the organization, playing a crucial role for the organizations’ competitiveness (Barney, 1991).

The international element of organizational architecture represents the international involvement in international markets. Ghoshal (1987) highlights that when organizations internationalize, they must take on completely new knowledge, including experiential knowledge of specific foreign business practices, institutional norms and general experiential knowledge of how to organize for foreign competition (Eriksson, Johanson, Majkgard, & Sharma, 1997).
The ICT element of organizational architecture refers to the presence of dissemination tools to facilitate information and knowledge flows within the organization. ICT facilitates knowledge sharing leveling temporal and spatial barriers, creating information bases storing data and promoting virtual knowledge teams (Kristof, Brown, Sims, & Smith, 1995). The knowledge embedded in ICT systems, results from years of accumulating, codifying and structuring the tacit knowledge in peoples' heads (Leonard-Barton, 1992). The most prominent instrument for facilitating knowledge sharing and communication within the company is intranet. However, the role of ICT in supporting knowledge diffusion within organizations goes beyond the facilities of intranet: ICT improves communication facilitating interaction between employees and reducing isolation. It enhances organizations’ efficiency reducing cost related to time of interaction and increasing effectiveness of communications (Love, Irani, Ghoneim, & Themistocleous, 2006).

The hierarchical element of organizational architecture pertains to the distribution of decision power within the organization. Simon (1969) claims that hierarchy is a mechanism for coordinating a complex system comprising multiple specialized units. Since organizations are viewed as institutions for integrating knowledge, hierarchical coordination involves decisions about the mechanisms through which knowledge is diffused within the organization: therefore hierarchies are crucial in shaping knowledge dissemination within organization boundaries (Grant, 1996). In defining their hierarchies, organizations focus on solving the trade-off between two opposite decisions: centralized decision-making versus delegation. Delegation has two opposite effects: while, on the one hand, it guarantees a better use of information throughout lower levels of the hierarchy, on the other hand, it could cause a loss of control for the higher-level managers (Jensen & Meckling, 1976).

The multidimensional nature of organizational architecture imposes a multiple component analysis. Specifically, we use 18 items (9 each year) of the Unicredit questionnaire. The chosen items are: concentration of power, group control, percentage of employees involved in R&D activities, percentage of employees with a degree, percentage of export revenues, countries export, ICT, ICT intensity and ICT tools. Concentration of power held by managers is the Herfindahl-Hirschman index of the stock shares owned by the three most important shareholders. Group control is a discrete variable assuming the value of 0 if the organization is not part of a group and the values of 1, 2 or 3 according to the position of the organization within the group distinguishing between: (i) leading; (ii) partially owned; (iii) fully owned. This item measures the
autonomy of the organization management in taking strategic decision. The percentage of employees involved in R&D activities is the share of employees working in the R&D function or with R&D mansions over the total number of employees. The percentage of employees with a degree is the share of employees holding a university degree over the total number of employees and it is used to compute the percentage of high skilled people working in the organization. The percentage of export revenues over the overall revenues and countries export, measured as the number of countries where the organization exports its products/services, represent two variables that are aimed to capture different dimensions of the international architecture, the quantitative (revenues) and the qualitative (number of countries). The last set of variables capture the ICT architecture: ICT is a dummy variables indicating whether the organization has invested in ICT; ICT intensity measures the percentage of investment in ICT over the overall investments in machineries and industrial equipment and ICT tools is a proxy for the diversity in the typologies of ICT used and it is constructed calculating the Herfindahl-Hirschman index of the investment made in hardware, software and telecommunications infrastructure.

We performed two separated PCAs, one for each wave, on the selected items with a varimax orthogonal rotation using the GPF algorithm (see Tables 1 and 2). We used the vgpf option in Stata; this option supports the retention of the four factors we identified.

Insert Tables 1 and 2 about here

The PCA enables us to identify the principal components that compose the organizational architecture. The elements were formed aggregating the items tapping into each construct, weighted by their respective factor scores. We conduct several tests to assess the psychometric properties of the measures. Factor loadings exceed the recommended cutoff value of .60, except for one item that has a lower value. From this analysis, we are able to identify the four dimensions that we define architectural elements: hierarchical architecture (concentration of power; group control), human capital architecture (percentage of employees involved in R&D activities; percentage of employees with a degree), international architecture (percentage of export revenues; countries export) and ICT architecture (ICT, ICT intensity and ICT tools). The four elements of the organizational architecture are aggregated to construct the dependent
variables of the model.

Architectural change is a measure of organizational architecture change over time. We obtain this measure looking at the changes of each organizational architecture elements from the period 2001-2003 to the period 2003-2006. Architectural change assumes value 0 if the organization has not made any significant change of its organizational architecture; it assumes value 1 if the organization presents a significant changes in 1 or 2 architectural elements -we are in the case of organizational architecture adjustment--; it takes value 2 when the organization presents changes in 3 or 4 architectural elements- this is the case of organizational architecture reorientation. We have a significant change when the difference between an organizational architecture element in the period 2001-2003 and the same element in the period 2003-2006 is higher then one standard deviation distance from the mean.

4.4. Operationalization of independent and control variables

Our independent variables are proxies for the performance gap. The organization compares its performance with the average industry-level performance; the difference between organization performance, measured as the organization total sale in 2003, and the average level of performance obtained by organizations belonging to the same sector defines the social aspiration level. Additionally, the organization compares its current performance with its previous performance; the difference between total sale in 2001 and total sale in 2003 defines the historical aspiration level. The social and the historical aspiration level are used to build our dependent variables, namely minor gap and major gap. Minor gap takes the value of 1 if either historical aspiration level or social aspiration level are negative, 0 otherwise; major gap takes the value of 1 if both historical aspiration level and social aspiration level are negative, 0 otherwise.

We control for organization size, calculated as the total sale that the organization has obtained in 2003, as well as for organization age, measured as the number of years. Furthermore, we control for R&D intensity, which is given by R&D expenditure over the total sales in 2003. We include a dummy variable, customer satisfaction assuming value 1 if the organizations control for degree of satisfaction of its customers, 0 otherwise. Finally, we control for R&D intensity by industry and for organization context by mean of 4 dummy variables that identify where the organization is located distinguishing between north-east; north-west; center and south
of Italy.

The questions underlying the outcome variables were placed after the questions underlying independent variables on the survey: this diminish the effects of consistency artifacts (Salancik & Pfeffer, 1977). We performed Harman’s one-factor test on the organization-level variables included in the models, to examine whether common method bias may augment the relationships detected. Since we found multiple factors, and since the first factor did not account for the majority of the variance (the first factor accounts for only 0.12 percent of the variance), potential problems associated with common method bias were not indicated by the test (Podsakoff & Organ, 1986).

5. Results

Table 3 reports the descriptive statistics of the variables included in the models. None of the correlations are alarmingly high ruling out any problems regarding the possibility of multicollinearity.

Insert Table 3 about here

To find empirical support for Hypothesis 1 (the presence of a performance gap increases the likelihood that the organization will modify its organizational architecture), given the nature of our dependent variable that takes value of 1 if the organization had changed its organizational architecture, 0 otherwise, we used a logit model as mean of estimation. The first column in Table 4 presents the model. We support Hypothesis 1 to the extent to which the existence of a performance gap is positive and significant in explaining the organization’s decision to change their organizational architecture.

Insert Table 4 about here

Concerning Hypothesis 2 (the presence of minor performance gap increases the likelihood that the organization will adopt small changes in their organizational architecture; i.e. adaptation)
and Hypothesis 3 (organizations that experience major performance gap are likely to adopt large changes in organizational architecture; i.e. reorientation), we use a nested logit estimation technique splitting the econometric estimation into two steps since our dependent variable, architectural change, can be considered a two stages decision. The nested logit model, first derived by Ben-Akiva (1973), represents an extension of the multinomial logit model. However, the multinominal logit suffers from a disadvantage known as the independence of irrelevant alternatives (IIA). This disadvantage is caused by a property of the multinomial logit that assumes that the relative probability of choosing between two alternatives is not affected by the presence of additional alternatives. In our case, alternatives are not independent since, as suggested by Hannan et al. (2003), changes in one single architectural element is likely to cause a cascade of other changes that involve other architectural elements.

Therefore, since the IIA assumption is violated, we used a nested logit model to group alternatives into sub-groups (nests) such that the IIA is still valid within each subgroup (Train, 2003; Winkelmann & Boes, 2006). Figure 3 describes the set-up of the specified model. The figure shows the asymmetric nature of the data in the sense that the second level outcome only is available if the respondent is confirmatory in the first level. Of the 755 observations available, 302 (40%) did not made any significant organizational architecture change, 423 (56%) decided to adjustment their organizational architecture; while the remaining 30 (4%) reoriented their organizational architecture. We follow Drucker and Puri (2005) using interaction effects to implement such an asymmetric specification. The nested logit modeling technique also require a reshape of the data observing each organization once for each of the three possible outcomes in the tree depicted in figure 3. Accordingly, we use a total of 2265 observations in the analysis. Table 4 presents the results of the nested logit regressions examining organizational architecture changes as opposed to the organization’s decision to not change its organizational architecture. The base category is therefore that the organization has not changed its organizational architecture. The first column of the Table reports the result of the logit estimation. The second column of the Table (model II) hold the results of the model in which we consider minor gap as independent variable of organizations while column 3 (model III) depict the regression results when studying major gap as independent variable.

Our results support Hypothesis 2 since we find that minor gap is positive and significant in explaining the organization’s strategic decision to embrace an adaptation strategy, but it is not
significant in explaining reorientation. Finally, we find empirical support for Hypothesis 3: our independent variable, major gap, is positive and significant in causing major change in the organizational architecture, leading the firms to adopt an organization’s reorientation strategy.

6. Discussions

The study has illustrated how organizations change their architectures in response to environmental feedback. Our intent has been to investigate the link between organizational architecture pattern of change and performance gap. Our results, described in the previous section, support the three hypotheses we developed. More specifically, we show that organization align their architectures to the environment following an alternative discrete model. We find support using a logit and nested logit as means of estimation: the decision behind adaptation or reorientation processes is influenced by the extension of the performance gap. In fact, the presence of a gap forces firms to modify their architecture and we also proved that the dimension of the gap influences the scale of the change. When performance feedback presents misalignment with only one dimensions of aspirational level, organizations apply minor changes in their architecture. On the contrary, organizations implement major changes, reorienting their architectural, when both historical and social aspirational level presents performance gap. This study has two relevant implications. First, modifications of organizational architecture can be seen as a discrete model. Second, under some circumstances, organizational stability can be beneficial (McCarthy et al., 2010; Tushman & Romanelli, 1985) and organizations are naturally adverse to risks and changes (Greve, 1998; Tsoukas & Chia, 2002).

Overall, our results suggest that organizations modify their architectures when the level of performance becomes distant from the desired level. Moreover, we prove that organizations adopt different strategies according to the extent of the performance gap they are call to fit. We believe that our work make several contribution, both for scholars and practitioners. This study contributes to the research stream on organizational change, it extends recent works that investigate the link between organizational change and performance and it enriches the current understanding of the decomposability property of organizational architecture. As regard to the contributions of this study for managers and practitioners, our study highlights the importance of a correct identification of aspirational levels (both social and historical), decisions are taken since on their bases. Moreover, we remark the presence of separate and interdependent elements with
an organization.

6.1. Implications for theory

The paper contributes to the scholarly debate on characteristics of organizational architecture and on decision processes behind organizational change. Firstly, this study informs research on organizational change (e.g. Hannah & Freeman, 1984; Hannan et al., 2003; Tushman & Romanelli, 1985). The literature asserts that organizational change is triggered, among other things, by sustained low performance. Evoking contingency theory (e.g. Siggelkow, 2001) and theory on aspiration (e.g. Greve, 1998), this study illuminates more clearly this phenomenon. Whereas previous contributions recognize the importance of environmental threats to choose between stability and change, they neither explain the direction nor the type of organizational change. Our study illustrates both the direction and the type of organizational change. Relying on our results, we argue that organizations undertake different strategies, namely adaptation and reorientation, based on the dimension of the performance gap. Moreover, we suggest that changes of organizational architecture are influenced by organization history and by the behavior of similar organizations. Thus, organizations consider previous experience as well as the behavior of other organizations in defining their strategy.

Second, we extend recent works that investigate the link between organizational change and performance. Nickerson and Zenger (2002), using a simulation model, explains that the strategic choices that organization makes to realign their organizational structure to environmental changes, follow an alternative discrete model. We contribute to this literature proving that organizations change their organizational architecture choosing between minor changes - i.e. adaptation- and major changes –i.e. reorientation- : the dimension of the performance gap is the break point where the advantages of organizational stability are lower the losses in competitive advantages. The break point highlights a failures in reaching the aspirational levels of performance.

Finally, this study enriches the current understanding of the decomposability property (Simon, 1969) of organizational architecture. Our results confirm the hypothesis that, when forced to modify their architecture, organizations rely on the possibility to decompose their architecture in a set of elements. In case of small performance gap, organizations act upon one or
two elements choosing an adaptation strategy: on the contrary, when the extent of the performance gap is more important, organizations change all the architectural elements, adopting a reorientation strategy. The decomposability property of organizational architecture constitutes the basis to understand the dynamic evolution of organizational architecture since it enables the achievement of a balance between the need for change - highlighted by the observed performance gap - and the riskiness associated with it.

6.2. Implications for practitioners

Contributions of this study for managers and practitioners are twofold. Firstly, our study proves that decisions are taken on the basis of two aspirational levels: historical and social. A correct evaluation of the performance gap must be done considering both levels. In fact, managers should appropriately identify the comparison group: organizations, in selecting their competitors, may incorrectly specify them. The risk is to realize the existence of a performance gap when the misalignment is with both levels, requiring a reorientation rather then an adaptation, with higher riskiness involved.

Secondly, in this research we suggest that organizational architectures are characterized by the presences of separate and interdependent elements and that such elements can be considered in isolation as well and in their interrelations with the other elements in the system. Our findings suggest that managers should be aware of such double interpretations that could lead them to consider single element in isolation or as components of an integrated system. According to the case (i.e. minor gap), one option might be to spend more attention at strategically manage each organization architectural element, changing it accordingly to the environmental feedback. Under different circumstances (i.e. major gap), the other option is to consider the interrelation among the elements, engaging into a more complex experience that will alter completely the architecture. The riskiness associated with the two options largely differs and, for this reasons, the decision must be taken after a careful evaluation of the signals coming from the external environment.

7. Concluding remarks

The study offers interesting avenues for future research. To investigate how changes on
organizational architecture affects performance was not among the objectives of the present work, but we believe that we could largely profit from such research. Future studies could deepen our understanding of the appropriateness of reorientation and adaptation strategies in case of major or minor performance gap. Moreover, we believe that this study unveils an interesting area to be explored: decisional and implementation process behind adaptation and reorientation mechanism and how organizations differently react to the different challenges that those strategies poses. We believe that similar studies can significantly enlarge the findings of the present work.

Our study is not without limitations. First, we suppose that in defining their gaps, organizations compare themselves to other organizations in the same industry and the current level of performance to the previous level. However, the process followed to select the comparison group varies among organizations and each organization selects subjectively its comparison group (Massini et al., 2005). An intriguing extension of this study would be the exploration of organization-specific comparison groups. The second limit of our analysis is related to the interplay between organizations and their environment. Environment can change organizations, but, at the same time, organizations can, in a limited manner, change their environment. Our point of view is, therefore, limited since we can only observe how the environmental feedback affects organizations and we are not able to detect how organizations modify their environment. Finally, it is important to acknowledge that organization strategy may depend on the characteristics of the geographical area in which the company is located. In this research, we used a sample of Italian manufacturing firms and the result may be affected by the specificities of the Italian context.
Tables and Figures

**Figure 1:** Conceptualization of organizational architecture changes

**Figure 2:** Organizational architecture changes and environmental feedback

**Figure 3:** Nesting structure of the implemented strategy
<table>
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**Principal component analysis 2004-2006**

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<td>Cumulative percent</td>
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**Principal component analysis 2004-2006**

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<td>0.14</td>
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Table 4: Econometric models

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Note: one-tailed tests: †p < .10; *p < .05; **p < .01; ***p < .001. Standard errors in parenthesis.
References


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