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MULTIMODAL CONSTRUCTION OF A RATIONAL MYTH: INDUSTRIALIZATION OF THE FRENCH BUILDING SECTOR IN THE PERIOD FROM 1945 TO 1970

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Abstract

This paper examines how proponents of industrialization used multiple modes of communication to socially construct the rational myth of industrialization in the French construction sector after WWII. We illuminate the respective roles of visual and verbal communication in this process. Our findings suggest that actors construct rational myths according to the following step-by-step method: first, they use visuals to suggest associations between new practices and valuable purposes; then they use verbal text to establish the technical rationality of certain practices; and lastly, they employ both verbal and visual communications to convey their mythical features.

Keywords: rational myth, multimodality, visual communication, substantive rationality

MULTIMODAL CONSTRUCTION OF A RATIONAL MYTH: INDUSTRIALIZATION OF THE FRENCH BUILDING SECTOR IN THE PERIOD FROM 1945 TO 1970

Rational myths, the cultural accounts depicting how organizations should operate in order to be considered legitimate in a field, represent a core construct in institutional theory (Meyer & Rowan, 1977). For the past four decades, this notion has provided institutionalists with much analytical inspiration and helped explain many significant instances of institutional and organizational change. The notion of myth evokes imagination and idealized reproductions of observable reality, casting images as central to myths. Before the invention of writing, images were used in caves to reproduce idealized accounts of past hunting trips or victories. Even after written accounts had largely superceded oral and visual retellings of myths, artists in ancient Greece continued to produce visual depictions of mythical figures and events (Giuliani, 2013). In the Middle Ages, churches opted for visual depictions of biblical stories as their preferred way to communicate myths to an often illiterate populace, favoring visual communication over verbal translations from Latin. In contemporary society, images and videos are used intensively in political campaigns to convey mythic accounts of the past and the future, and in marketing to appeal to consumers' imagination of a better life (McQuarrie & Phillips, 2005). In the same vein, widely diffused rational myths such as "Total Quality Management" and "Sustainability" have been intrinsicly linked to iconic visuals as well, e.g., the Deming wheel and the triple bottom line schemes[1] (Boiral, 2007; Boiral & Gendron, 2011; Höllerer, Jancsary, Meyer & Vettori, 2013; Zbaracki, 1998; Höllerer, Jancsary & Grafström,

[1] https://www.google.fr/search?q=total+quality+management&source=lnms&tbm=isch&sa=X&sqi=2&ved=0ahUKEwi6o_GpwdHTAhWJ5xoKHY6MB0oQ_AUIBigB&biw=1366&bih=589#tbm=isch&q=deming+wheel&spf=502 and https://www.google.fr/search?q=total+quality+management&source=lnms&tbm=isch&sa=X&sqi=2&ved=0ahUKEwi6o_GpwdHTAhWJ5xoKHY6MB0oQ_AUIBigB&biw=1366&bih=589#tbm=isch&q=sustainability+triple+bottom+line&spf=826

2014), respectively. Thus, Semilogist Roland Barthes' likening of images to perpetual "resurrections" (Barthes, 1964: 40) resonates strongly across time and space:.

Despite the centrality of images in mythical accounts, visual communication has received only scant attention in the literature on rational myths. According to this literature, rational myths have two key properties: 1) They are rationalized prescriptions that stipulate the appropriate means to rationally pursue certain social purposes; 2) They are highly institutionalized, i.e. their legitimacy is taken for granted (Meyer & Rowan, 1977: 343-344). Rational myths help guide organizational action in meaningful and legitimate directions, reflecting the institutional order. While most of the literature has focused on the functions that rational myths perform in organizations and fields (Meyer & Rowan 1977; Hallett, 2010; Zilber, 2006), only limited attention has been devoted to the social construction of rational myths. We have some insight into how rational myths come into existence (see *e.g.*, Greenwood, Suddaby & Hinings, 2002), what discursive form they take (Meyer & Rowan, 1977) and what functions they perform in organizations (Hallett, 2010; Zilber, 2006). Since it is rather difficult to demonstrate the validity of rational myths, recent work suggests that organizational actors often decouple means from ends when they implement rational myths in organizational practice (Bromley & Powell, 2012). These insights into the dynamics of rational myths have been developed almost exclusively from the analysis of verbal data. Previous work has largely ignored how visual representation contributes to the emergence, spread and institutionalization of rational myths. This paper aims to illuminate the particular role of visuals relative to verbal communication in establishing and spreading a rational myth within an organization field.

To examine this topic empirically, we carried out a longitudinal and multimodal analysis of the rational myth of industrialization. This rational myth stipulates that industrialized production processes enhance both productivity and working conditions at the same time, thereby enabling the production of good affordable products for the benefit of society at large.

The origins of this rational myth can be traced to the industrialization of car production in the early 20th century, the success of which other economic sectors have tried to imitate. When the tangible benefits of industrialization failed to manifest themselves as expected in other sectors, the successful industrialization of the car industry developed into a rational myth that swept across, and fundamentally transformed, a wide range of socioeconomic sectors. This rational myth was adopted in the construction sector after WWII, where proponents introduced it as a promising new vision for constructing buildings.

Our study examines how proponents of this myth introduced and diffused it in the French construction sector from 1945 to 1970. We extracted both visual and verbal data from *Construction Moderne*, a French professional trade journal that advocated the widespread adoption of novel construction techniques and new building materials in architecture (Leniaud & Bouvier, 2001). In addition to shaping the verbal discussion of novel construction techniques in France during that period, this trade journal made extensive use of visual elements (pictures, blueprints, tables, etc.) to convey meaning. Our analysis pertains to how proponents of the industrialization myth used the verbal and visual modes of communication to promote this myth in the French construction sector. A mode of communication is defined in social semiotics as "a socially shaped and culturally given semiotic resource for making meaning" (Kress, 2010: 79). It is a particular way of encoding meaning for communication purposes.

Our findings yield several interesting insights into how proponents of the rational myth of industrialization utilized both verbal and visual elements to socially construct the rational myth of industrialization in the French construction sector. First, our longitudinal analysis revealed three consecutive stages in the social construction of this rational myth, which consisted in experimenting with couplings of means and ends, associating a variety of different means to formal ends (*i.e.*, technical rationality), and further associating some of these means to substantive ends (*i.e.*, mythical components). Second, our multi-modal analysis showed that

the visual mode of communication operated differently than the verbal mode of communication during each of the three stages. Most strikingly, we found the visual realm to enable experimentation, suggest potential linkage with socially valuable ends, and help establish the mythical features of the rational myth. In contrast, the verbal realm has a confirmatory power that served first to establish the technical rationality of different construction practices and then to build the rationale for their mythical features. These findings resonate with Barthes' (1964) account of verbal language as expressing relatively determinate meanings, whereas images "say" nothing. As a whole, our study suggests that actors socially construct rational myths according to the following step-by-step method: first, they use visuals to suggest associations between new practices and valuable purposes; then they use verbal text to establish the technical rationality of certain practices; and lastly, they employ both verbal and visual communications to convey their mythical features.

In the remainder of this article, we review the most relevant literature on rational myths and visual communication, including multimodality (*i.e.*, the use of multiple modes of communication). We then outline our methodology and present our key findings. The paper ends with a discussion of the implications of our findings for the literature on rational myths and, more broadly, for multimodal inquiry within institutional analysis.

Rational Myths As Means-Ends Relations

Rational myths convey shared meanings and understandings associated with social structures and collective practices in an organizational field (Meyer & Rowan, 1977; Zilber, 2006). In the words of Meyer and Rowan (1977: 345), "modern societies are filled with institutional rules which function as myths depicting various formal structures as rational means to the attainment of desirable ends". These taken-for-granted relationships between rational means and desirable ends that make up rational myths are "idealized cultural

accounts, and not necessarily something 'false'" (Hallett, 2010: 54). For instance, Max Weber's notion of legal rationality "describes a socially constructed cultural mythology, not an objective reality of seamless rules and optimal decisions" (Suchman & Edelman, 1996: 940). Accountability qualifies as a rational myth in as much as it carries symbolic value far beyond its technical qualities (Hallett, 2010). The case is similar in military procurement, where the purchase of advanced weaponry is often driven by discursive ties to modernization and sovereignty rather than by technical requirements (Suchman & Eyre, 1992). Rational myths thus imbue certain practices with symbolic value above and beyond their technical qualities.

Inspired by Weber (1921[1968]; 1930[1992], we distinguish between formal rationality and substantive rationality in our conceptualization of means-ends relations. According to Bromley and Powell (2012), *formal rationality* expresses itself in ends that relate to efficiency and optimal technical output. We engage in formal rationality when we "calculate the most precise and efficient means for the resolution of problems" (Kalberg, 1980: 1158). In contrast, *substantive rationality* reflects deeply held values such as family, environmental protection, and social justice. We are motivated by substantive rationality when we pursue societal value beyond the scope of formal rationality. The distinction between formal and substantive rationality is important because decouplings between means and ends are more pronounced when ends are substantive than when they are formal (Bromley & Powell, 2012). More elusive and abstract in nature, substantive rationality can be difficult to associate with organizational means. Since the very construct of rational myths refers implicitly and simultaneously to both formal and substantive rationalities, we advance the following definition: *A rational myth is an idealized cultural account of organizational practices, expressed in the form of taken-for-granted means-ends relationships that reconcile any potential incompatibility between formal and substantive forms of rationality.*

Rational myths not only imbue organizations with legitimacy, but also inspire, motivate and justify actions. In an organizational context, rational myths help organizational actors make sense of new structures and practices, which they often implement without having had any immediate experience of them (Sahlin-Andersson, 1996). Rational myths can also reinforce professional identity, in as much as their symbolic value may be derived from elements of the occupational training and professional identity of the actors who implement them (Tilcsik, 2010). Finally, rational myths may be mobilized to manage meaning (Zilber, 2006), introduce new practices, policies and experts (Hatchuel & Weil, 1995), or justify restructurings and lay-offs. Rational myths are essentially social constructions. Previous research suggests that rational myths are rarely invented from scratch, but travel over time and across institutional realms (Carruthers & Espeland, 1991; Haveman & Rao, 1997; Zilber, 2006). Actors adapt them to the specific characteristics of an organizational field and to the perceived priorities at the time (Zilber, 2006). Drawing on Swidler's work on culture (1986), Zilber argues that rational myths take the form of a 'tool kit' composed of rhetorical and symbolic resources, from which social actors draw selectively and dynamically. Actors may even draw on multiple rational myths to shape the meaning of a social practice, and in so doing adjust the relative prevalence of rational myths in a field (*ibid*: 298).

Reproduction is key to the social construction of rational myths. Meyer and Rowan (1977: 356) insisted that "organizations must not only conform to myths but also maintain the appearance that the myths actually work." Recent research suggests that organizations seek to implement rational myths, but often end up decoupling the means from the ends in the process (Boxenbaum & Jonsson, 2017; Bromley & Powell, 2012). By decoupling the means from the ends, organizational actors convey the appearance of implementation, which helps sustain the rational myth within the organization and, by extention, within the organizational field.

Although these insights advance our understanding of how rational myths are socially constructed, the literature on rational myths remains fragmented and offers no integrated view of the phenomenon. One step towards integrating this literature consists in a longitudinal analysis of the processes through which means and ends become associated with one another over time. Another step is to examine how actors draw on multimodal resources to establish and consolidate such means-ends associations. In this paper, we examine how actors construct means-ends relationships that simultaneously mobilize formal and substantive rationalities of relevance to the organizational field in question. Our analysis covers several decades and examines their use of both visual and verbal communication.

Visual Communication and Multimodality

At a fundamental level, communication relies on modes to transmit meaning. Modes include verbal text (*e.g.*, a book), visual representation (*e.g.*, a photograph), material form (*e.g.*, a building), and sound constellations (*e.g.*, instrumental music). Meaning is stored and communicated differently depending on the mode that is used for communication (Meyer, Höllerer, Jancsary & Van Leeuwen, 2013), and institutional effects may differ as a result of the selected mode (Meyer, Jancsary, Höllerer & Boxenbaum, 2017). Similar meanings can be expressed in different modes (Kress, 2010), yet many acts of communication activate several modes simultaneously to complement or reinforce one another. For instance, movies combine visuals, verbal expression, and sound to vividly communicate meaning.

Although images can be used in conjunction with text, visuals have some unique attributes that make them particularly well-suited for cultural accounts that seek to establish means-ends relationships. One strength of visual communication lies in its ability to stimulate imagination. Visuals have a remarkable "capacity to invoke without arguing, as well as to bridge and blend" (Höllerer *et al.*, 2013: 164). Marketing research has shown that consumers

spontaneously generate positive inferences about a product when presented with an indirect claim in the form of a metaphor, a reaction that is more pronounced when the indirect claim is presented as a picture rather than as verbal text (McQuarrie & Phillips, 2005). Visuals stimulate imagination; in fact, "they derive their persuasive effects especially from this implicitness, ambiguity, and openness" (Höllerer *et al.*, 2013: 146).

The suggestive nature of visuals makes this mode particularly well-suited for reconciling inconsistencies, transcending dichotomies, and addressing topics that are difficult to articulate verbally (Höllerer *et al.*, 2013). First of all, the plastic nature of visuals enables the simultaneous communication of antagonistic ideas, thereby helping to mediate and balance them (*ibid*: 142). For instance, a visual representation that portrays two antagonistic elements together is insinuating a compatibility between them. Such suggestive communication is more difficult in written text, aside perhaps from poetry, because audiences expect written communication to articulate the relationship between elements. Secondly, the visual mode carries a stronger claim to truth (Jancsary, Höllerer & Meyer, 2016: 184). Visual communications, notably photographs, imply that the scenes depicted are "real", i.e., that they exist in the social or physical world independently of their visual representations. This facticity feature exists because "the visual is capable of an accuracy and plenitude of description that verbal language cannot match" (Meyer *et al.*, 2013: 494). Thirdly, visuals are characterized by a certain "immediacy" (Raab, 2008; Höllerer *et al.*, 2014). Research suggests that "visuals convey central messages and create strong emotional responses much more immediately than verbal descriptions" (Jancsary *et al.*, 2016: 185). In fact, visuals "present themselves to the observer instantaneously, as a spatially arranged totality of meaningful parts" (Meyer *et al.*, 2013: 492). Elements of meaning are represented holistically in the visual mode, whereas verbal text favours a sequential, linear ordering of such elements (*ibid*:

493). As a novel data source, visuals carry high potential to advance theory development (Buchanan & Bryman, 2007, p. 483).

In this paper, we are particulary interested in how actors leverage the three identified strengths of visual communication (transcending dichotomies, truthfulness and immediacy) in combination with verbal communication to build an idealized *cultural account of organizational practices, expressed in the form of taken-for-granted means-ends relationships that reconcile any incompatibilty between formal and substantive rationalities.*

Methods

Empirical phenomenon

Our empirical study addresses the rational myth of industrialization, notably the multimodal efforts of a group of professionals to socially construct this rational myth in the French construction sector in the post-war period. Industrialization originally describes the process in which a society transforms itself from a primarily agricultural society into one based on the manufacturing of goods and services. It now also points to the transformation of any economic sector where individual manual labor is replaced by mechanized mass production and craftsmen are replaced by assembly lines (Hounshell, 1985; Meyer, 2003). The myth of industrialization refers to the widespread belief at the time that mechanized mass production would significantly enhance not only the cost-efficiency of production, but also the quality of life for workers, who would earn a higher salary and/or improve their working conditions. Consolidated in the automobile industry at the turn of the 20th century, the myth of industrialization spread rapidly to other economic sectors during the early 20th century, hitting the construction sector rather late in the diffusion process (Boxenbaum & Daudigeos, 2008).

Data source

Consistent with our goal of exploring how a rational myth is purposefully constructed in a new field, we looked for relevant historical archives in which to track multimodal communication by its proponents (Daudigeos, Boutinot & Jaumier, 2015). We selected for this purpose *Construction Moderne*, a professional trade journal for French architects and other construction professionals interested in avant-garde construction techniques and materials. This trade journal, which was prevalent in the 20th century, started publishing articles in 1886 and continues to publish today. During our period of inquiry (1945-1970), the trade journal published articles weekly or bi-montly, accompanied by numerous images, including photographs, tables, and blueprints. The trade journal covered topics such as modernist architecture, new construction materials (notably concrete), and new building processes (such as the prefabrication of construction materials). This journal represented a vibrant arena for proponents of industrialization to express themselves and to debate new trends with other construction professionals sharing an interest in avant-garde construction techniques. We verified this characterization of the trade journal with its current editor in chief and with key members of the trade association *French Career and Building Materials Industries Union* (UNICEM). These informants confirmed our description of the trade journal as a pro-modernity outlet for architects and other professionals supportive of (the rational myth of) industrialization.

Data collection

Since the issues of the journal from the period in question exist only on paper, we started by searching the journal's annual indexes for potentially relevant articles. To obtain a broad selection of articles, we selected all articles that discussed the material "concrete*"* ("béton" in French), which amounted to 206 articles published between 1945 and 1970. We scanned all of these articles, carried out optical character recognition and saved the files as

MS Word files, correcting all text errors resulting from the digitization process. Subsequently, we selected all the articles that mentioned industrialization, which yielded 35 articles from 1945 to 1970. Having access to articles from this journal prior to 1945, we verified that industrialization had not occurred prior to 1945. Only one entry (in 1938) appeared prior to our period of study, which confirmed the relevance of our starting date. As for ending data collection in 1970, we chose this year because postwar reconstruction was well completed by then.

Data analysis

We designed an exploratory and interpretative study to understand how professionals, via multimodal communication in *Construction Moderne,* imported the rational myth of industrialization into the construction sector. We tracked how these professionals framed means-ends relationships associated with the notion of industrialization to build idealized cultural accounts of organizational practices in the domain of construction. Using Atlas.ti, we systematically analyzed the means-ends relationships related to industrialization within the 35 selected articles. We first carried out an open coding of the means and the ends associated with industrizalization, using an inductive approach (Gioia, Corley & Hamilton, 2013). We identified 523 relevant verbal segments and visual elements within these 35 articles (413 verbal segments and 110 visual elements) where either means or ends were closely associated with industrialization.

To track the number of verbal text segments through time and minimize discrepancy between coders, we standardized the length of verbal text segments to one to three sentences that constituted one unit of meaning. We considered the absolute number of such segments to be more significant than their relative prevalence across the textual data. Taking into account that industrialization was not the main topic of the trade journal, we deemed meaningful *per*

se the absolute number of verbal text segments related to industrialization across the period of study. We coded these 523 verbal text segments, using codes from a constantly updated list of open codes, resulting in 1376 applications of codes.

We then engaged in data reduction for analytical purposes, distilling a smaller number of means and ends (Van Maanen, 1979). To do so, we went back and forth between the data and the literature on industrialization and means-ends relationships to draw links with existing concepts. Tables 1 and 2 show the data structure of the means and ends. We aggregated ends into two types, reflecting Weber's (1921[1968]; 1930[1992]) distinction between formal and substantive rationalities (see also the theory section). Formal rationality expresses itself in ends that relate to efficiency and optimal technical output, whereas substantive rationality reflects deeply held values such as family, environmental protection, and social justice. Accordingly, formal ends pertain to efficiency and optimal technical output; substantive ends to substantive value over and above the expected direct contribution of particular means to achieving formal ends. We aggregated means into six categories – new materials, standardization of building elements, rationalization of work processes, mass production, mass market and state intervention, which are well described in the literature on industrialization processes (Hounshell, 1985; Meyer, 2003).

Insert Tables 1 & 2 about here

We subsequently analyzed the relationship between means and ends, distinguishing two types of relationships. First, we coded positive relationships between means and ends as coupling, and negative relationships as uncoupling. Uncoupling refers to a relationship between means and ends that is explicitly negative (in contrast, decoupling does not assert any relationship, whether positive or negative, between specific means and ends). The following sentence represents a particularly unambiguous example of a means-ends coupling:

"Prefabrication has a double purpose: speed and savings" (own translation, *Construction Moderne*, 1949, issue 12). A corresponding example of an uncoupling is: "However, let us remember that uniformity leads to monotony and that it would be wasteful, from our perspective, to impose standardization, which conflicts fundamentally with the individual spirit of French people" (own translation, *Construction Moderne*, 1958, issue 5). We differentiated between coupling and uncoupling to preclude the risk that uncoupling (*i.e.*, critique of certain means or ends) would be treated as couplings in our study. However, verbal couplings (157 in total) clearly outnumber verbal uncouplings (28 in total) across the period of study. This difference confirms that professionals writing in *Construction Moderne* were strong proponents of industrialization.

Finally, we used the codes derived from the verbal text analysis to analyze the visual data in Atlas.ti. We coded means and ends, as well as apparent couplings between them. In coding images, we relied on our interpretive functions, which are very useful in the absence of established methodologies for coding images (Jancsary *et al.*, 2016; but see also Jancsary, Meyer, Höllerer & Boxenbaum, this volume, for emerging coding rules for visual data). We started with the aggegrated dimensions identified in the coding of textual data and determined unequivocal features of visual data that related to these dimensions. We then clarified our coding rules as much as possible in order to minimize interpretation variability between coders. Table 3 shows the correspondance we established between aggregate dimensions and specific features of visual data. To increase the validity and reliability of our interpretive analysis, we had several authors code the images and the text segments independently before comparing coding results. We subsequently discussed and aligned coding rules to minimize divergency in interpretation.

Insert Table 3 about here

Inspired by a process theory approach (Langley, 1999), we subsequently analyzed how the couplings (and uncouplings) between identified means and ends evolved over time. Through this analysis, we identified a recurrent pattern that explains how proponents of the rational myth of industrialization progressively crafted a vibrant and relevant new meaning system for the French construction sector. By coupling means and ends in certain ways, professionals helped to introduce and sustain the rational myth of industrialization in the French construction sector for a quarter of a century. We identified specific roles of visual data in this process, which involved three consecutive (overlapping) processual steps, which we outline in the findings.

Findings

Our findings suggest that professionals contributed proactively to introducing and sustaining the rational myth of industrialization in the field of the French construction industry during the post-war period. As we show below, professionals gradually crafted means-ends constellations by coupling and uncoupling potentially relevant means and ends, drawing on both formal and substantive rationality. We identified three overlapping, consecutive stages through which professionals proceeded to craft means-ends constellations that would enable an introduction of the rational myth of industrialization in the French construction industry. These steps were: 1) experimenting with couplings/ uncouplings between multiple means and ends (1945-1952); 2) coupling of selected means to formal ends (throughout the 1950s); and 3) further coupling of selected means to substantive ends (predominant in the 1960s). Regarding the role of visual elements in the social construction of a rational myth, we found that visual and verbal representations play different and complementary rhetorical roles in the process. In the following section, we elaborate on each

of these steps, presenting findings pertaining to the verbal analysis and the visual analysis, respectively.

Step 1: Experimental associations between many means and ends (1945-1950)

Professionals began to introduce the rational myth of industrialization in the French construction industry around 1945, in conjunction with postwar reconstruction. Their initial efforts consisted in experimenting with a variety of loosely coupled means and ends. During the first period, they discussed a wide range of means and ends, all of which could possibly be linked to the introduction of industrialization in the construction sector. This was a very fruitful period in terms of idea generation; in fact, some individual years yielded more than 100 verbal text segments containing relevant means or ends (1945/46; 1947; 1949). Yet, interestingly, as shown in Figure 1, there were only few instances of couplings between means and ends in the verbal texts published during this period.

Insert Figure 1 about here

During the initial phase, proponents of the myth of industrialization debated how it could, and should, be applied to the construction sector. However, they connected means and ends in a loose manner; only very few tight couplings can be found in the articles of *Construction Moderne* during this first period. As we see in Figure 1, uncouplings were as common as couplings were throughout the initial phase, which was characterized by experimentation. This result may be a direct manifestation of the uncertainty experienced by the professionals who expressed themselves in *Construction Moderne.*

When we turn to the role of visual versus verbal representation of experimental couplings, we see in Figure 1 a more significant number of visual couplings than verbal couplings at the beginning of the period under study than we do later on. This trend is

interesting because it suggests that visual representations may have played a particularly important role in the earliest phase. Associations are ambiguous and suggestive in visual representation. They may *imply* a causal relationship between visually associated elements, but they do not make any *claims.* Accordingly, proponents are less accountable if they suggest a means-ends association through visual representation than through verbal representation.

Figure 2 introduces a series of construction pictures that were all published during the introduction phase. This figure shows a great variety of means associated with industrialization during this initial stage, including some evocative associations of aestheticism, standardization and the repetition of construction elements. We see in these buildings that diverse materials are associated with industrialization: bricks, steel, and concrete. The architecture of the dwellings is far from standardized; in fact, these pictures represent a broad interpretation of what repetition and standardization mean.

Insert Figure 2 about here

Step 2: Coupling of selected means to formal ends (throughout the 1950s)

Experimentation gave way to more targeted couplings during the second phase of the period under review, when the rational myth of industrialization spread within the French construction sector. During the 1950s, proponents of the rational myth of industrialization began intensively to couple relevant means to formal ends. In other words, they started to claim causal relationships between specific elements of the construction process (the means) and some technical objectives of building construction (formal ends). The quotes below illustrate some couplings between means and formal ends that emerged during this period:

1953(11)2: "*A recent leaflet published by the United Nations outlines the conditions for reducing the cost of construction and for increasing the industrialisation of construction […]. We summarize them below:*

- *Establish long term programs to facilitate the introduction of mechanical equipment and increase productivity*

- *Simplify the regulations in the construction industry (…)*
- *Favor the development and the practical application of standardization*"

1955(10)1: "W*e contend that industrial esthetics solves many production issues (…), and enhances the quality of mass production for unlimited quantities*."

Figure 3 shows that the coupling of means to formal ends took place primarily in the 1950s, a process that continued well into the 1960s. Figure 4 further shows that all six means from the second-order codes were mobilized at this stage.

Insert Figures 3 & 4 about here

Proponents of the rational myth began to select the most relevant means and claim their technical benefits for the construction process. Figure 4 shows that building materials such as wood, brick and steel were mobilized in means-ends couplings at the beginning of the second period, but then disappeared from couplings when concrete became the dominant material associated with the rational myth of industrialization in the means-ends relationships. Whereas professionals' selection of means narrowed somewhat over time, no particular means predominated in couplings with formal ends in the 1950s.

As for multimodal analysis, we found that visual representation played a strikingly minor role during this second stage. Table 4 indicates fewer couplings involving formal ends than substantive ends in the visual data, whereas the opposite is characteristic of the verbal data. The great majority of couplings between means and formal ends appear in the verbal text. We interpret this finding as an indication that formal rationality is best accomplished verbally, that is, means-ends relationships that are technical in nature are perhaps easier to convey in text than in visual form.

Insert Table 4 about here

Step 3: Further coupling of means to substantive ends (predominant in the 1960s)

As time passed, couplings increasingly involved substantive ends, that is, ends that were deemed socially valuable, above and beyond the technical objectives of construction. In the 1960s, coupling of means to substantive ends began to dominate, meaning that professionals engaged increasingly with the potentially mythic components of rational myths (see Table 4). They generated means-ends relationships that were harder to confirm technically, such as the claim that the rationalization of work processes leads to a higher quality of living for building occupants. Professionals also created more complex means-ends relationships involving both formal and substantive rationality, such as the statement that state intervention in the construction sector will lower the costs of construction and produce more residences to house the expanding number of urban dwellers. Figure 3 shows the verbal couplings of means with substantive ends, which increased over time, peaking in the 1960s. The citations below illustrate coupling between means and substantive ends that manifested in the verbal data during the third period (our translation from French):

1965(2)_1: "*Mr Maziol, Minister for Construction, declared : I am convinced that through the industrizalization of building, we will reach a new architectural expression. Industrialization is a key element for the future of architecture.*".

1969(5)_1: "*The principle of construction lies in the assemblage of precast elements. […] This design offers great freedom for architects to express themselves and brings sufficient leeway to diversify frames as needed (1,75m; 3,50m or multiples of 0,30m).*"

With regard to multimodality, we found that visual representation played a significant role in coupling means to substantive ends. Table 4 indicates that visual elements proposed couplings above and beyond the couplings found in the verbal text. The contribution of visual

elements to couplings was more significant when ends were substantive than when they were formal in nature. We interpret this finding as an indication that visual representation may be useful for communicating means-ends relationships that are abstract, complex or mythical in nature. These relationships may be harder to assert in verbal text, in part because authors may more readily be held accountable for the validity of such statements. In contrast, visual representation, being more suggestive, may lend credibility to means-ends relationships that are quasi-mythical or otherwise unverifiable. An image, particularly a photograph, may be all that is required as evidence of the "objective reality" of the proposed means-ends relation. Figure 5 shows some visual elements that associate means with multiple ends and suggest substantive ends.

Insert Figure 5 about here

Disaggregating findings to validate the three-step model

In this final section on findings, we show further empirical support for the validity of our three-step process model and for the different contributions of visual and verbal data to each step. We have disaggregated our findings into the six means that appear in the second-order coding (see Table 2). Figure 6 shows that the three-step pattern which we presented in the previous sections applies to five of the six means. After a short, indecisive period from 1945 to 1950, five means – standardization, mass market, rationalization of work processes, concrete and state intervention - were strongly associated with formal ends in the 1950s before entering a much more balanced period in terms of coupling with substantive or formal ends (1960s). Figure 7 describes the evolution of verbal couplings for standardization throughout the period under review. Mass market, rationalization of work processes, concrete material, and state intervention all follow similar patterns. Only mass production, which is represented in Figure 8, shows a slightly different pattern, one where the last two steps are

inverted (*i.e.*, coupling to substantive ends happened before coupling to formal ends) and where the total number of couplings peaks in the 1950s. We interpret this finding as an indication that mass production may have stimulated dreams (substantive ends) prematurely. Although such dreams were significant in the 1950s, the formal ends of mass production were not established at that time, which may have undermined mass production as a privileged means in the implementation of the rational myth of industrialization. The effect of this divergent pattern may well be that mass production never became an integral part of the rational myth of industrialization in the French construction sector.

Insert Figures 6-8 about here

As for multimodality, we see a similar pattern when we disaggregate the data. Figure 9 shows that the associations in visual representations involve primarily substantive ends. When we divide the findings into individual means, we also see a higher incidence of associations at the beginning of the period than later on.

Insert Figure 9 about here

Discussion

The rational myth of industrialization flourished during the postwar reconstruction and subsequent urban development of France. Promoters of this rational myth, belonging to an avant-garde community of architects and other construction professionals, advocated the widespread adoption of new construction practices and materials. They expressed their ideas in *Construction Moderne*, a professional trade journal devoted to modernist architecture, concrete material, and novel construction techniques. In this paper, we examined empirically how the proponents of the rational myth of industrialization proceeded to construct the rational myth of industrialization within the French construction sector.

Our analysis focused on the use of verbal and visual communication to align this myth with the characteristics and priorities of the French construction sector. As defined in the beginning of this paper, a rational myth is an idealized cultural account, expressed in the form of taken-for-granted means-ends relationships, that draws on both formal rationality and substantive rationality and reconciles any potential incompatibility between them. Accordingly, we analyzed means and ends, as well as the relationship between them, in verbal and visual representations of this myth published in *Construction Moderne* in the period from 1945 to 1970. In addition to this multimodal analysis, we provided a temporal analysis that indicates how couplings between means and ends evolved over that time.

We found in our longitudinal analysis that proponents of the rational myth of industrialization proceeded through three steps to socially construct the rational myth of industrialization in the field. Our multi-modal analysis revealed some interesting differences in how proponents of the rational myth leveraged verbal and visual elements at each of these three stages. During the first (experimental) step of the process, we found more associations between means and ends in visual representations than in verbal accounts. During the second step of the process, means were coupled to technical ends, using verbal text rather than visual representation. The visual realm apparently has little to contribute at this stage. In the third step of the process, means were associated with substantive ends, using both verbal text and visual representation. Our interpretation of this finding is that the associations between means and substantive ends required multiple modes of communication to consolidate the mythical claims that were made during this last stage in constructing the rational myth of industrialization in the French construction sector. In the subsequent sections, we discuss the implications of these findings for the literature on rational myths and multimodal communication, respectively.

Processes of socially constructing rational myths

Our research advances previous insights into how rational myths are actively reshaped as they encounter new institutional realms or new historical contexts (Carruthers & Espeland, 1991; Haveman & Rao, 1997; Zilber, 2006). We add to this line of work a deeper understanding of how actors progressively craft and reinforce means-ends relations that align with key characteristics of the targeted field. Our study sheds light on the temporal aspects of coupling formal and substantive rationalities to specific practices in the process of socially constructing a rational myth. The original theoretical formulations emphasize that rational myths need to be constantly reproduced in order to survive (Meyer & Rowan, 1977). We show in this study that such reproduction requires significant reconstruction of means-ends relations when a rational myth is transposed to another field.

The processual model that we developed from our empirical data is composed of three consecutive (somewhat overlapping) steps through which proponents of a rational myth proceed to reconstruct means-ends relations to reflect relevant practices and valuable purposes in the new field. First, they experiment with couplings between a wide range of means and ends that are loosely, or potentially, related to the rational myth in question. Second, they couple some of these means to formal ends, *i.e.*, to technical objectives related to the field. Third, they couple these means further to substantive ends, *i.e.*, to broader goals or social values in the field. The result, we suggest, is the consolidation of a set of means-ends relationships where tangible means (*e.g.*, practices) first obtain technical certification (through formal ends) and then become tightly associated with broader field-level objectives (through substantive ends). This simultaneous linking of tangible means to both formal and substantive ends may require formulations that transcend any potential contradictions between them, a topic we return to in the next section. For instance, the triple bottom line of corporate sustainability stipulates that sustainability initiatives should simultaneouly meet concrete

financial objectives, social purposes, and broader ecological goals (Höllerer *et al.*, 2013). Very similarly, in the third step of our case, the practices linked to industrialization such as mass production or the use of concrete are associated with greater productivity, but also highly valuable social purposes such as architectural aestheticism, the satisfaction of basic human needs or the quest for social justice. Such a win-win construction relies on both formal and substantive rationalities, which may (and regularly do) conflict with one another in the context of a specific organizational practice.

Our definition of rational myths highlights their ability to transcend any opposition that may exist between formal and substantive rationalities. Such transcendence is required in as much as rational myths imbue the means-ends relationships with both instrumental qualities and mythical properties, both of which are essential for the construction, and survival, of a rational myth. For instance, the apparent alignment of the instrumental and mythical dimensions imbues rational myths with an ability to motivate and justify organizational change (Hatchuel & Weil, 1995) and other organizational practices (Bromley & Powell, 2012). The transition from stage two to stage three of our model may be particularly important in this regard. Rational myths often rely on formal rationality for which there is no definitive proof, and the addition of substantive rationality at the last stage only intensifies the challenge of convincing audiences of the validity of a rational myth. The roles of visual and verbal communications in this process are not yet clear, yet offer some interesting prospects for multimodal analysis. Taking inspiration from Höllerer and colleagues (2013), who argue that visual communication is superior to verbal text in reconciling inconsistencies and transcending dichotomies, we turn to a discussion of the roles of verbal and visual communication in socially constructing rational myths.

Visual and verbal commmunication in the construction of rational myths

Our study of multiple modes of communication suggests that visual and verbal representations play complementary roles in the construction of a rational myth. Visual representation seems to lend itself more readily than verbal text to the creation of novel and imaginative couplings between means and ends, whereas verbal text seems to be superior in expressing abstract causal relationships, particularly when they are potentially verifiable.

Verbal text seems to help actors formulate abstract causal relationships between means and ends, regardless of whether the ends were formal or substantive. Bromley and Powell (2012) found that means-ends decouplings were more prevalent for substantive rationality than for formal rationality. We did not find a higher level of decoupling between the two forms of rationality, but we noted an increased prevalence of visual communication when means-ends relationships were tentative, suggestive, or somewhat idealized. Such situations occurred in the explorative (early) phase of social construction and in the last phase when means were coupled to substantive ends, *i.e.*, when highly abstract and potentially mythical purposes were added to pragmatic means-ends constellations to formulate a rational myth. This finding suggests that verbal text may lend itself well to the establishment of abstract causal relations, particularly when such relations are verifiable and/or logical.

Visual representation, in contrast, seems particularly helpful in communicating tentative, ambiguous and/or imaginary causal relations. We have identified three unique advantages of visual communication in relation to rational myths. Firstly, we propose that visual representation plays a suggestive role in the experimental phase (*i.e.*, the first step) of socially constructing a rational myth. Previous literature suggests that visuals make suggestions, rather than overt claims in as much as they operate through implicitness and ambiguity and can invoke meaning without arguing or explicitly asserting (Höllerer *et al.*, 2013). This characteristic of visual communication encourages audiences to engage exploratively with means-ends couplings. Such exploration occurs in the early stages of social construction when

actors can take advantage of all options being open and all couplings having a tentative status. In our case, at this stage, industrialization was associated with a great variety of means and constructions, as Figure 2 illustrates. Visual communication enables actors to make implicit and ambiguous suggestions that conveniently blur any intentionality or need for accountability (Meyer *et al.*, 2013).

Secondly, actors can use visual communication to claim that a rational myth represents objective truth without providing more than exemplary support for this claim. Previous work suggests that the visual mode has a stronger claim to truth (Jancsary *et al.*, 2016: 184) because of its fact-like character, sustained notably in photographs (Graves, Flesher & Jordan, 1996). This function of visual communication is particularly helpful, we argue, in the third stage of the construction process, when proponents communicate complex means-ends relations that transcend formal and substantial rationalities. Visual representation can help convey such social constructions in a fact-like manner, using only examples as supportive evidence. We contend that this feature of visual communication can be helpful in communicating the mythical properties of a rational myth, which are difficult to transmit convincingly through verbal text only. The two photographs shown in Figure 3 are striking because they evoke mass production, productivity, the aestheticism of construction and a new life style all at the same time. The truth-claim characteristic of visual communication can also, potentially, help in transcending formal and substantive rationalities.

Thirdly, the immediacy of visual communication appears to be useful in both the early and later stages of the social construction of a rational myth. The holistic properties of visual communication are responsible for the immediacy with which we perceive visuals (Höllerer *et al.*, 2014). This holistic impression can help audiences readily endorse a rational myth that is unfamiliar to them, despite its having little objective support. Such endorsement may be more difficult to gain through verbal means. The immediacy of visual perception may also, at later

stages, remind audiences instantaneously of a rational myth with which they are already familiar. Such reminders may sustain its reproduction and thus help a rational myth to thrive and survive in spite of the lack of objective support for its validity.

In summary, we suggest that the unique features of visual communication complement verbal text in the social construction of a rational myth. Essentially, we contend that verbal text is helpful in asserting causal relations between means and ends, regardless of whether the ends are formal or substantive, whereas visual representation appeals to imagination and enables the communication of imaginary, ambiguous or tentative means-ends relationships. It is entirely possible that the ability of a rational myth to inspire action in the absence of valid support for its claims relies largely on the use of visual communication. Visuals may sustain the mythical dimensions of a rational myth in important and hitherto unrecognized ways.

Limitations and avenues for future research

Our multimodal findings and discussion have some implications for multimodal research methods. Given the complementary nature of the visual and verbal modes of representation, we recommend that future research on rational myths adopts multimodal research methods whenever possible. We also suggest that researchers make an effort to distinguish more clearly between the insights they gather from each mode of inquiry, as well as how insights obtained from different modes interact with one another to explain the object of analysis. Herein resides significant potential for producing new insights into rational myths and, perhaps more widely, into a wider range of institutional and organizational phenomena.

Our study was conducted using a small amount of data and relying on emergent interpretive strategies for multimodal data analysis. We recommend that institutionalists and other organizational scholars begin to develop methodologies that can capture and process insights from multimodal inquiries that are conducted in a more systematic and

epistemologically robust manner. For this purpose, we refer readers to the chapter by Jancsary and colleagues (this volume), which offers a more comprehensive account of the visual mode of communication and demonstrates its methodological application to institutionalist inquiry.

Our study is based on a relatively small amount of data pertaining to one rational myth in one particular field. In order to validate the generalizability of our findings, future research should compare our findings to similar dynamics in other fields and/or in relation to other rational myths. Future research could also mobilize a broader range of data sources to examine the extent to which proponents of a rational myths succeed in influencing organizational field members outside of their own community.

Conclusion

The multimodal research methods that we used in this study shed new light on the social construction of a rational myth in a field. Using an interpretive methodology and relatively small amounts of multimodal data, we showed how visual and verbal representations complement each other and how they each contributed to the social construction of rational myths. Our study demonstrates the added value of using multimodal methods for institutionalist inquiry. By adding the visual mode of communication to the more commonly used verbal mode, we obtained new theoretical insights into the social construction of rational myths. More research is clearly required on this front, particularly in terms of articulating the methodological and theoretical complementarities of different modes of communication.

Our work also sheds light on the temporal aspects of socially constructing rational myths. We identified three stages in this process, but more work is needed here as well, particularly in terms of studying how potential oppositions between formal and substantive rationalities are resolved, or how actors transcend them. We encourage future research to investigate not only the social construction of rational myths, but also their institutional effects. Perhaps the

concept of rational myths can help explain why certain practices, but not others, become institutionalized in an organizational field. The prospects are very promising for future inquiry into the social construction of rational myths and multimodal institutional inquiry.

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FIGURE 1: COUPLINGS AND UNCOUPLINGS IN VERBAL AND VISUAL COMMUNICATION, 1945-1970.

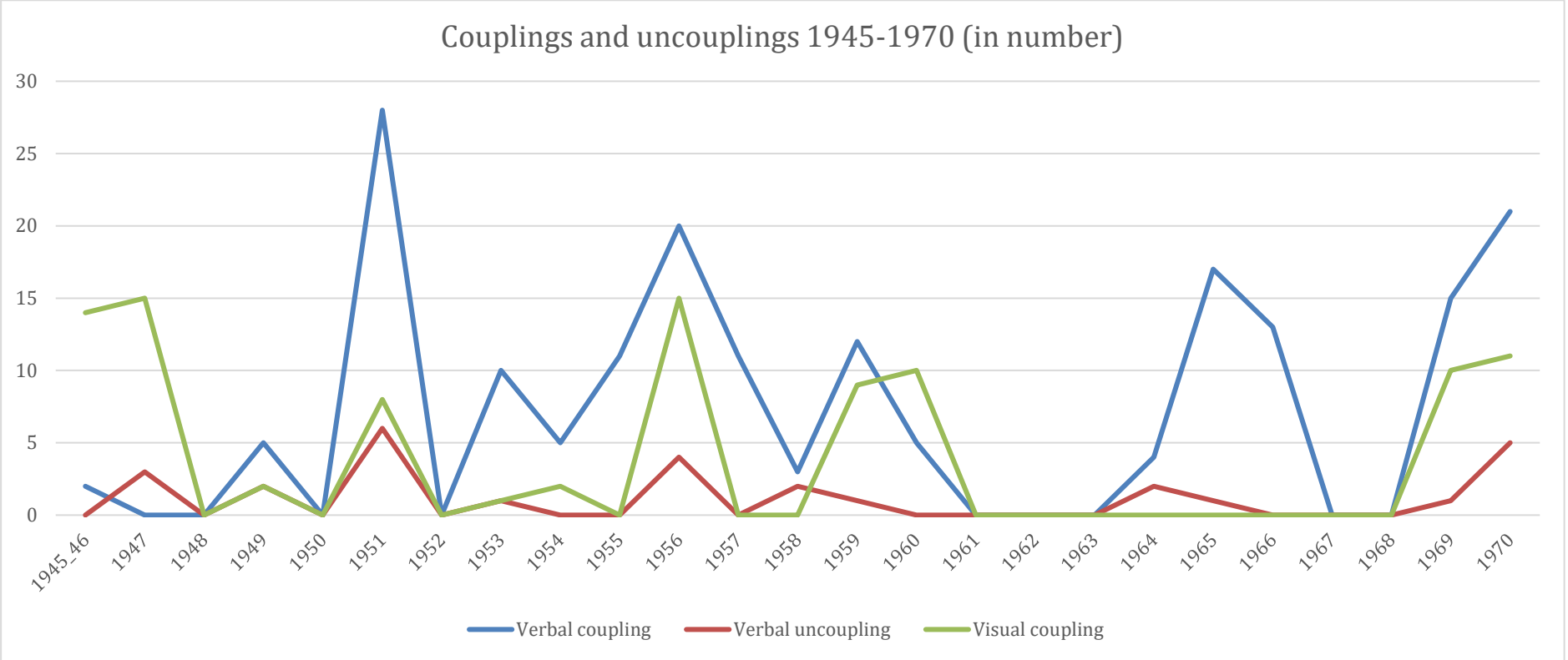
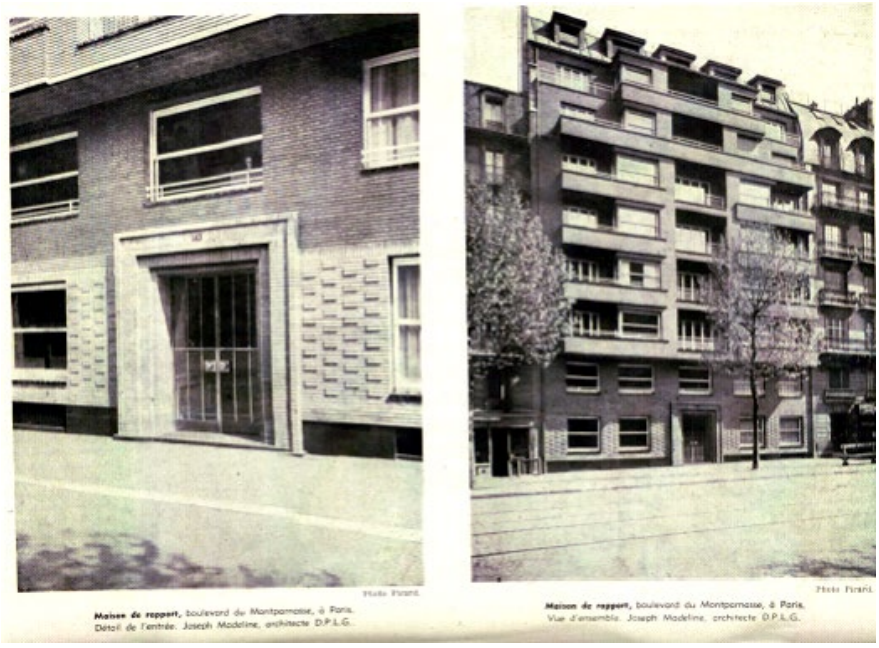
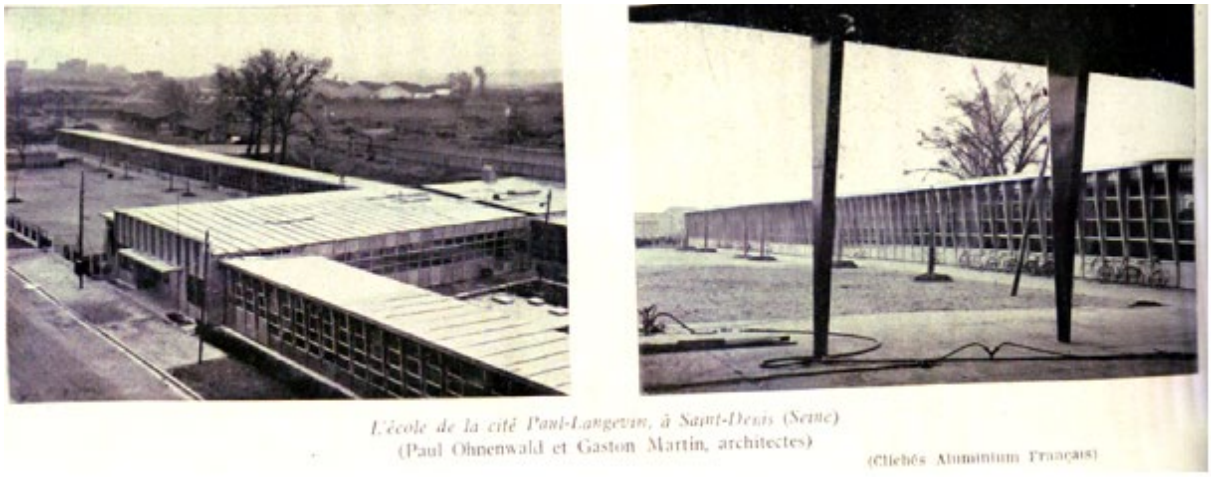


FIGURE 2[2]: IN THE FIRST PHASE, VISUAL ASSOCIATIONS ARE NUMEROUS AND DIVERSE





[2] Copyrights remain with the original producer. On request, the authors will honor the rights of these producers.

FIGURE 3: VERBAL COUPLING OF MEANS TO FORMAL ENDS TAKES PLACE PRIMARILY IN THE 1950S, WHILE MEANS ARE PROGRESSIVELY COUPLED TO SUBSTANTIVE ENDS LATER, PEAKING IN THE 1960s

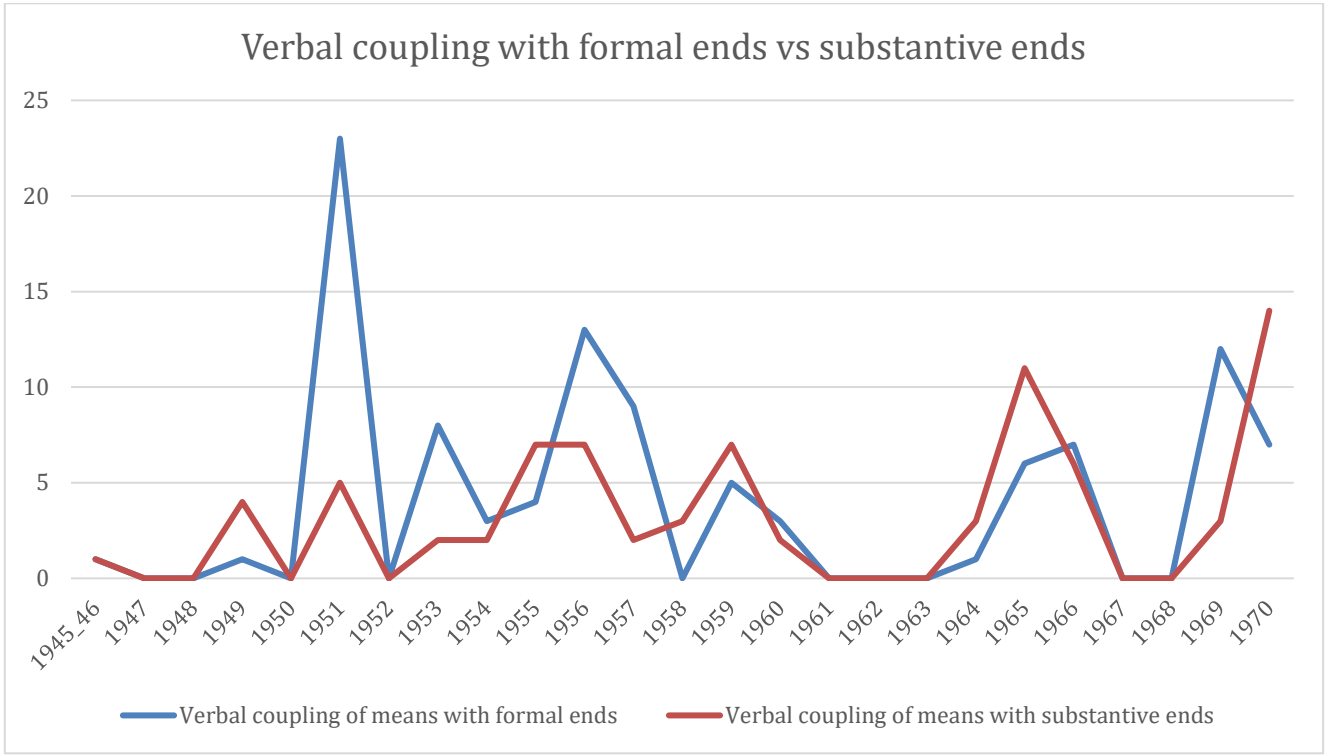


FIGURE 4: MANY DIFFERENT MEANS ARE COUPLED WITH FORMAL ENDS DURING THE 1950s

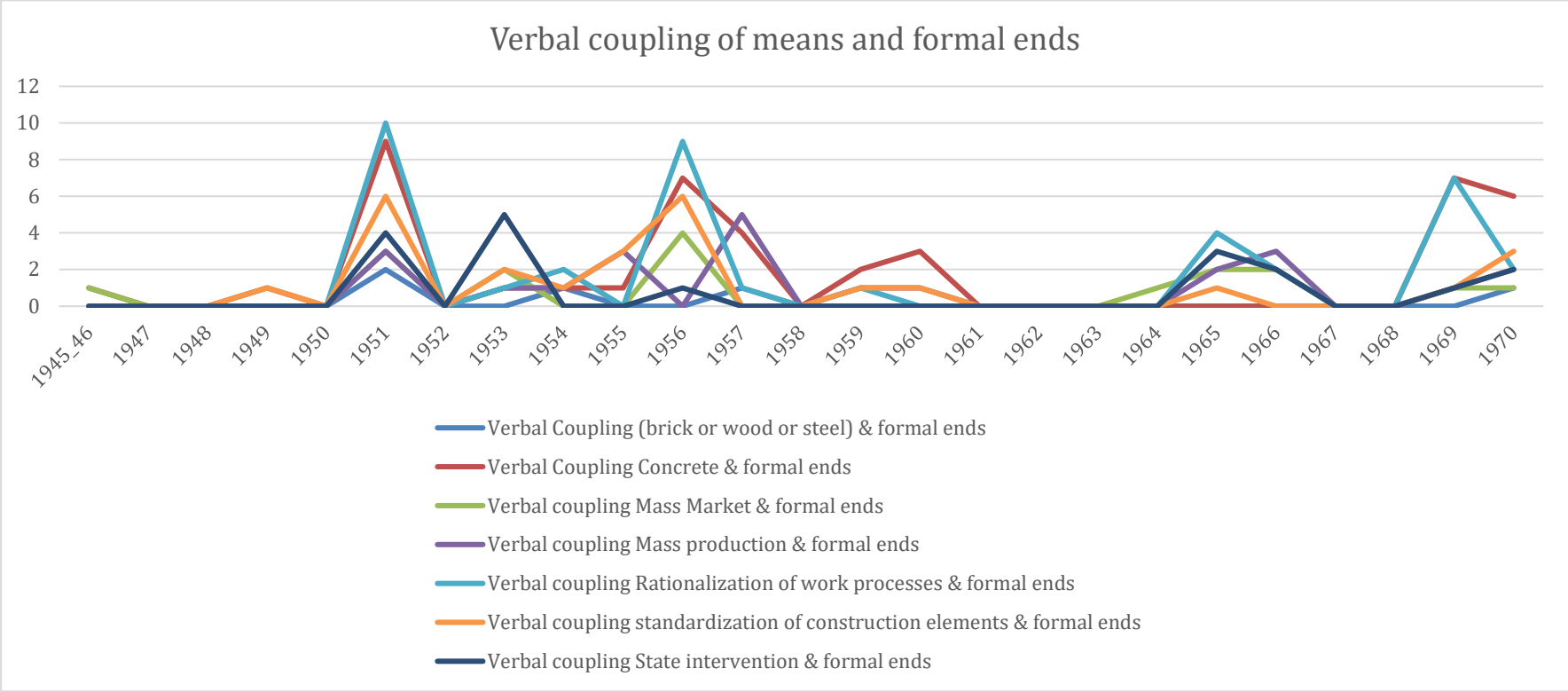


FIGURE 5[3]: VISUAL REPRESENTATIONS ARE HELPFUL IN CREATING ASSOCIATIONS OF MEANS WITH MULTIPLE ENDS AND ESPECIALLY WITH MYTHICAL SUBSTANTIVE ENDS

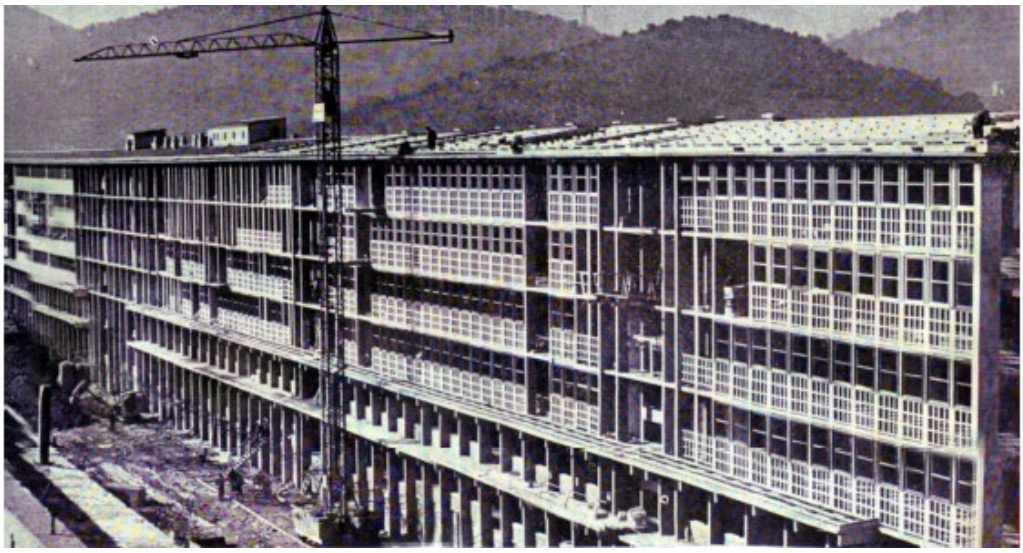


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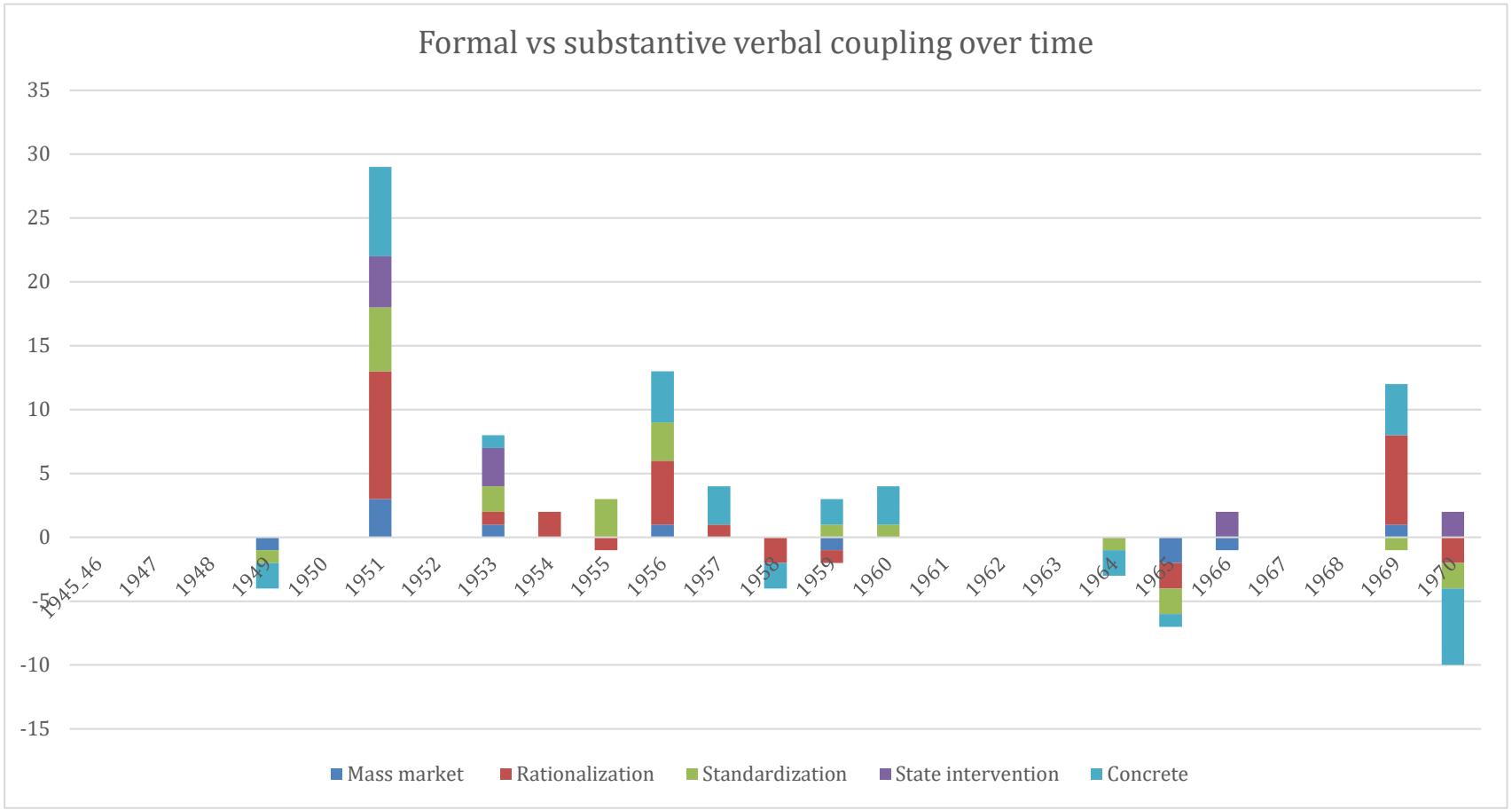
FIGURE 6: MEANS ARE COUPLED WITH FORMAL ENDS MORE OFTEN THAN WITH SUBSTANTIVE ENDS IN THE 1950s



For each means and year, we have computed the following indicator: the number of textual segments where the means is coupled with a formal end minus the number of textual segments where the same means is coupled with a substantive end. If the indicator is >0, there is more coupling with formal ends than with substantive ends. If the indicator is < 0, then there is more coupling with substantive ends than with formal ends.

FIGURE 7: THE MEANS “STANDARDIZATION” HAS A PATTERN OF COUPLINGS THAT CORRESPONDS TO THE PATTERNS OBSERVED FOR THE MEANS MASS MARKET, CONCRETE, RATIONALIZATION OF WORK PROCESSES, STATE INTERVENTION

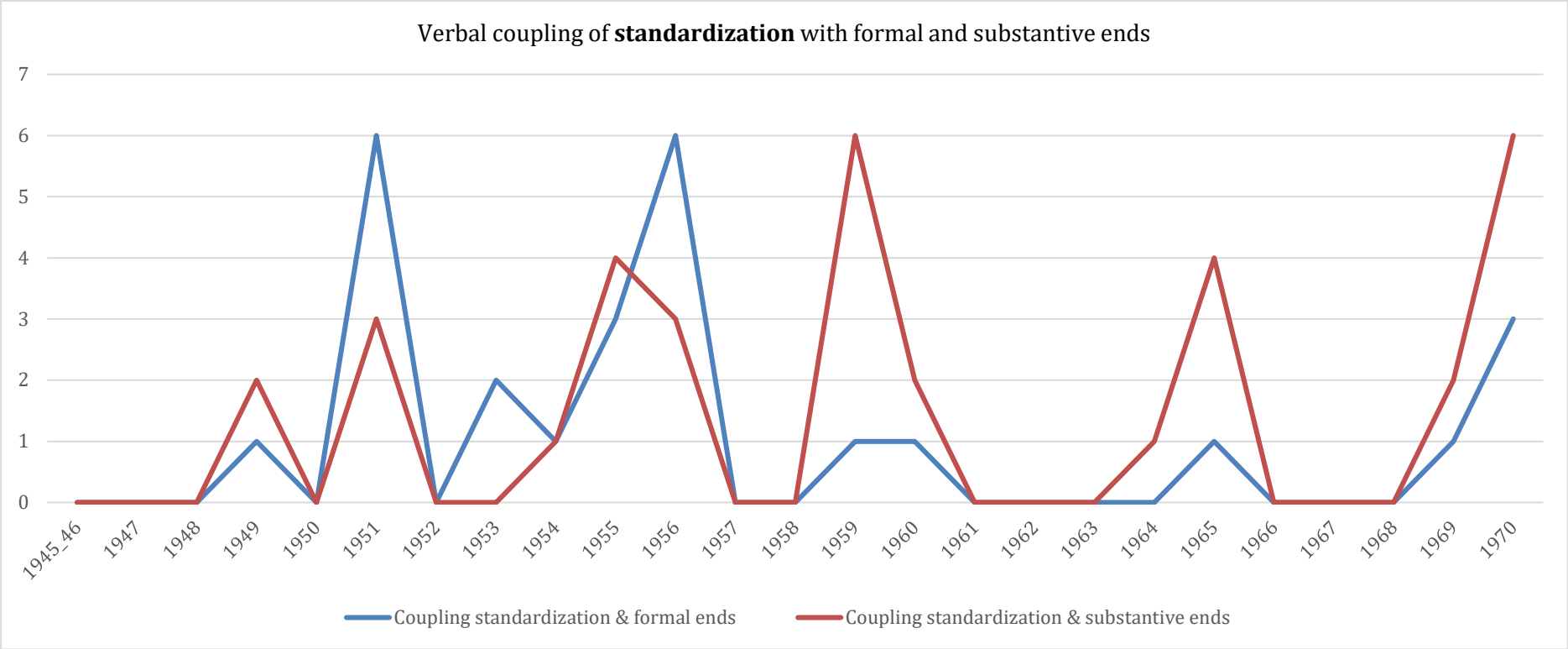


FIGURE 8: THE MEANS “MASS PRODUCTION” HAS A PATTERN OF COUPLINGS THAT DIFFERS FROM THOSE OBSERVED FOR OTHER MEANS

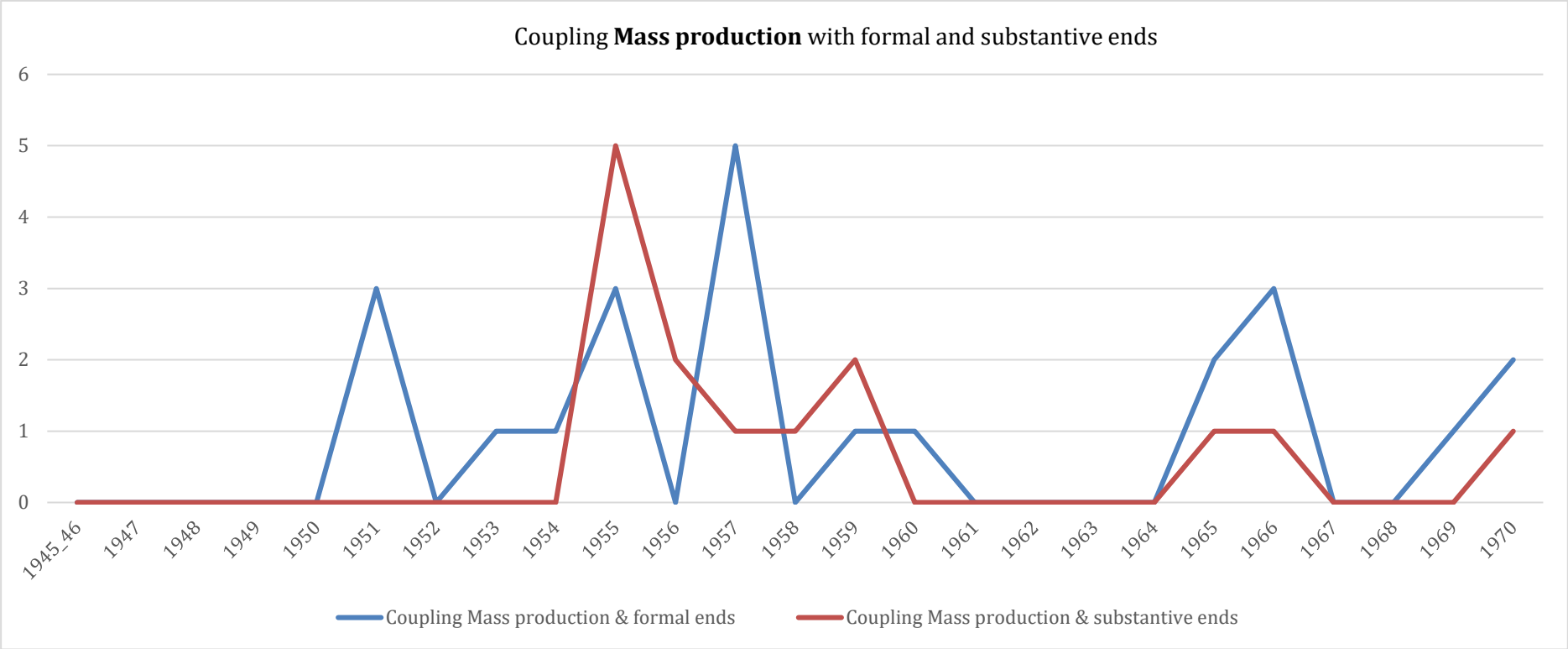


FIGURE 9: MORE VISUAL ASSOCIATIONS OF "STANDARDIZATION" WITH SUBSTANTIVE ENDS THAN WITH FORMAL ENDS, PARTICULARLY IN THE EARLY PHASE

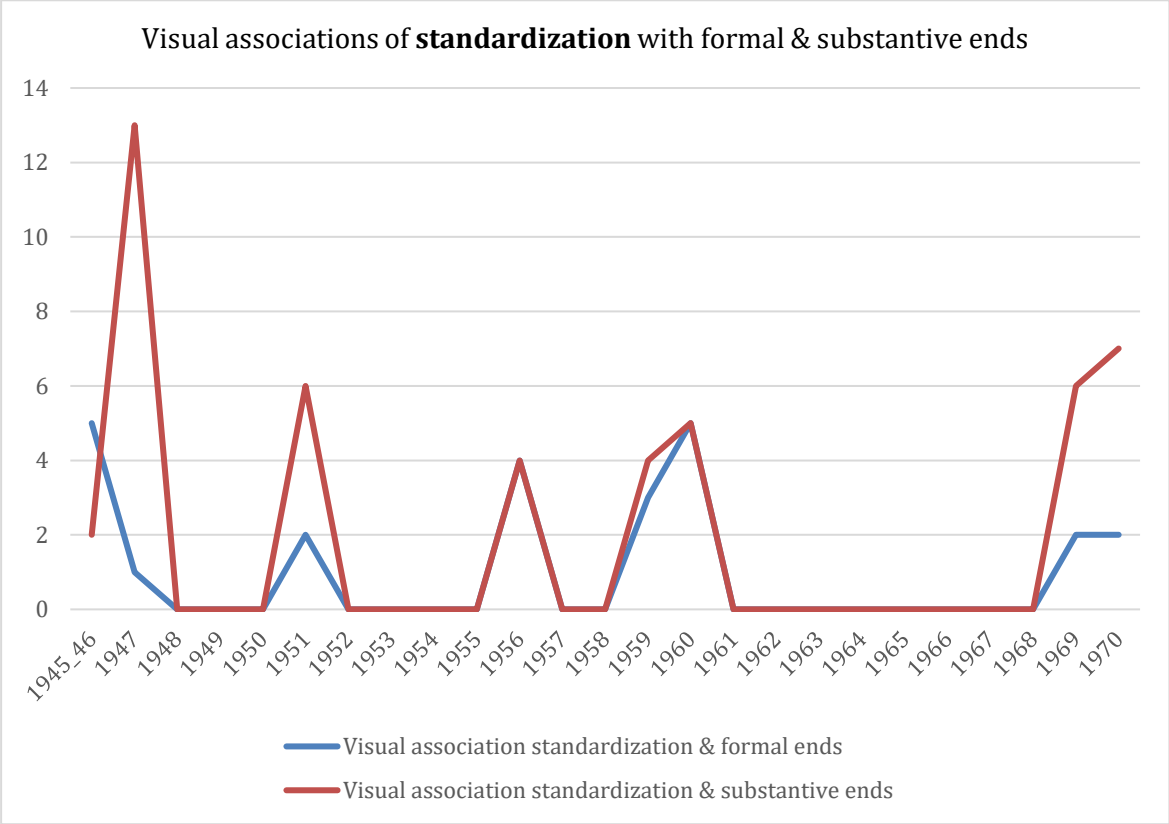


TABLE 1: ANALYSIS OF ENDS IN TEXTUAL DATA (DATA STRUCTURE)

ENDS			
Quotes	**First order codes**	**Second order themes**	**Aggregated dimensions**
1949(12)_1 “The key point being to quickly, economically and cleanly accomodate thousands of French who are waiting for a roof, we must agree that the new methods are striving to satisfy them”.	Quantity of outputs	Production of outputs	FORMAL ENDS
1949(5)_2 “It seems that we imagine new 'techniques' offering all desirable guarantees from the point of view of acoustics or thermal insulation”.	Technical quality of outputs		
1959(4)_3 “Reducing "construction time”, which is particularly catastrophic in France regarding the cost, has become the main aim of building technics”.	Increase pace	Productivity of processes	
1959(4)_3 “From the lack of manpower, the difficulty of recruiting skilled workers, to the shortage of knowledge in both quantitative and qualitative manners, it is important to oppose simplified means of production to their extreme and maximum mechanization.” 1951(9)_1 “Because of the considerable financial effort that illustrates this aim achievement, we are addressing a problem of habitats settings leading to a specific reduction of both materials and cost of housing".	Reduce cost: -Workforce saving -Material and energy savings		
1947(1)_1 “By reducing the time spent traveling and by affecting a large number of workers in the preparation of elements in factories, we will undoubtedly improve not only their working conditions, but also their living ones”.	Enhance working conditions	Human needs and social justice	SUBSTANTIVE ENDS
1949(12)_1 “The traditional physiognomy of a province is not necessarily compromised by the invasion of prefabrication."	Adapt construction to local needs		
1951(11)_2 “These elements, interchangeable at will, offer the advantage of composing facades according to the needs and the way of life of the inhabitants and of respecting the individual despite the rigorous unity imposed by industrialization”.	Improve wellbeing and lifestyle		

1951(2)_4 “The industrialization of the building sector does not inevitably lead to the collapse of aesthetics: it can and must create new ones”.	Aesthetics	Beauty of outputs	
1945(9)_1 “The module, once selected, will be respected in the composition of the plans. This method allows the architect the easiest composition.”	Freedom for architects		
1965(2)_1 “In summing up the first day, M. Claudius Petit concluded that the industrialization must offer diversity and quality through mass production.”	Diversity and variety		

TABLE 2: ANALYSIS OF MEANS IN TEXTUAL DATA (DATA STRUCTURE)

MEANS		
Quotes	**First order codes**	**Second order themes**
1945-46(9)_1 ”Manufactured through mass production, without any interruption in ultra modern factories, bricks can be used in large masses, which will allow architects to produce beautiful effects.”	Brick	New materials
1954(11)_2 “The evidence was thus made that a judicious use of steel, far from increasing the building price, makes possible significant savings.”	Steel	
1960(2)_3 “ We then had to design economic and sometimes high height walls in order to maximise the templates set by regulations. As a result, buildings reach 6 floors for the Building D, 7 for the Building E, and 9 levels for the Buildings A, B and C. To reach this dual goal, all exterior walls were made of reinforced concrete piers using rough white cement.”	Concrete	
1965(2)_1 “Finally, from now on, building is not only the result of improvisation. We know we can accelerate the progress of building works only by rationalizing the act of building, and that is precisely because of the attention we give to studies that the works may be shorter.”	New work processes in construction	Rationalization of work processes
1965(2)_1 “The use of the assembly of prefabricated elements will impose greater precision in their manufacture, and, sooner or later, will require from the manufacturers of these elements a very important research and investment effort.”	Precision & Technical coordination	
1953(11)_1 “Due to the building complexity, relationships between architects and engineers evolve on a daily basis. What will the nature of those be ? The good harmony that already exists at the building stage should also exist in the design stage.”	New collaboration among professions	
1953(11)_1 “ The architect must also complete his knowledge of industrialization principles – influence his training – and he could even specialize in this.”	Training of workers	
1951(9)_1 “… the mass and the continuity of programs, both being indispensable for encouraging manufacturers and entrepreneurs to make the needed investment efforts.”	Homogeneous market and collective dwellings	Mass market
1965(2)_1 “The industrial building market, to enable a healthy investment depreciation implied by the industrialization, must be a sufficiently large, homogeneous, and continous market.”	Large market	

1949(5)_2 “Thanks to these new measures[...], the amount of loans can reach up to 85% of the total cost of constrution”.	Financing	
1956(12)_1 “There has been a significant increase in the number of dimensional standards of building elements.”	Standards (dimensions and modularity)	Standardization of construction elements
1959(4)_3 “[Architectural design] has to tend towards the simplification of main volumes and their contituents elements – ease of manufacture –, the repetition of these elements –, standardization and mass production –, the ease of their juxtaposition and assemblies – simplification of assembly.”	Repetition of similar and simple elements	
1956(12)_1 “Plants, which are being created, manufacture structural and equipment elements that can be assembled quickly on building sites.”	Substitute factory to building site	Mass production
1956(12)_1 “On building sites, mechanization and assembly methods tend to replace traditional operating methods.”	Mechanization and better technologies	
1957(7)_1 “The necessary investment to industrialize the construction process amounts to two and a half times the annual salary of each worker employed.	Investment	
1951(9)_1 “In order to continue lowering the cost of building and improving building techniques, the Minister of Reconstruction and Urban Development is authorized to establish 10,000 dwellings per year from 1951 to 1955.”	Public procurement and financial support	State intervention
1945-46(9)_1 “The Ministry of Reconstruction and Urban Development has developed the French R.E.E.F., i.e. a repertoire of elements and fabricated elements and a code of the minimum technical conditions of building construction leading to a financial allocation from the State."	Technical requirement and state approval	
1965(2)_1 “Industrialization is an essential element of the future of architecture ... To facilitate the work of architects, the French administration will have to loosen regulations.”	Regulatory framework and liberalization of the market	

TABLE 3: ANALYSIS OF MEANS-ENDS IN VISUAL DATA

	What is in the visual data?	Related codes
Photo	Completed buildings alone	Ends: Beauty of outputs
	Completed buildings with surroundings (trees, …)	Ends: Human needs and social justice
	Completed buildings with life scene (people)	Ends: Human needs and social justice
	Interior layouts	Ends: Human needs and social justice
	Repetition of similar construction elements	Means: Standardization of construction elements
	Large series of dwellings (individual houses or apartment blocks)	Ends: Production of outputs Means: Mass production
	Site under construction	Ends: Productivity of processes
	Site under construction with visible cranes or other machines	Means: Rationalization of work processes
	Explicit use of new materials (bricks, concrete, steel and metal)	Means: New materials
Blueprint	Representation of new work processes	Means: Rationalization of work processes
	Representation of large series of dwellings	Ends: Production of outputs Means: Mass production
	Representation of very large construction projects (entire discrict…)	Means: Mass market
	Representation of repeated construction elements	Means: Standardization of construction elements
	Representation of interior layout, any element suggesting usage.	Ends: Human needs and social justice
	Representation of outdoor layouts	Ends: Human needs and social justice
Table	Explicit figures about increased outputs quantity	Ends: Production of outputs Means: Mass production
	Explicit figures about the use of specific processes	Means: Rationalization of work processes
	Explicit figures about increase in productivity or reduced costs of building	Ends: Productivity of processes

TABLE 4: VISUAL COUPLINGS FAVOR SUBSTANTIVE ENDS THROUGHOUT THE PERIOD

	1945-1950		1951-1959		1960-1970		Whole Period	
Number of textual segments	Formal ends	Substantive ends	Formal ends	Substantive ends	Formal ends	Substantive ends	Formal ends	Substantive ends
Verbal coupling all means	2	5	65	35	36	39	103	79
Visual couplings all means	12	19	15	20	12	19	39	58