IMPROVISATION IN NEW PRODUCT DEVELOPMENT: THE CONTINGENT ROLE OF MEMORY AND INFORMATION FLOWS

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Abstract

Unlike the extant literature, which stresses the value of prior planning, an emerging body of research argues that improvisation, the convergence of planning and execution in time, occurs frequently in firms and could be proven a valuable metaphor for research and practice. To extend this body of research, I have conceived and tested the impact of organizational memory and information flows sources on the effect of improvisation on various new product outcomes. The results from a survey among Dutch food firms show that declarative memory impedes, while internal information flows facilitate the impact of improvisation on timeliness. Moreover, internal and external information make improvisation financially successful. Finally, external information and procedural memory hamper where as internal information facilitate the effect of improvisation on product creativity. These findings paint a rather complicated portrait of the potential and challenges associated with improvisation.

Keywords: improvisation, memory, information flows, new product outcomes.

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Suggested Track: A

1 INTRODUCTION

A recent and emerging body of organizational literature, building on a diverse body of studies, ranging from arts to military campaign, argues that improvisation--the extemporaneous organizational action in which planning and execution converge in time--occurs frequently in firms and could be proven a valuable metaphor for research and practice (Crossan, 1998; Weick, 1993, 1998). The growing interest of many practitioners in improvisation reflects their discontent with standard strategic planning tools (e.g., forecasting), which emphasize prior and central planning, assuming stable and certain conditions or at best predictable change (Kamoche, Cunha, and Cunha, 2003). However, today's hyper-competitive environments require creative leaps, real-time responses, and adaptive firms in general (Crossan, 1998). As a possible solution, a small but increasing body of organization researchers proposes that improvisation can free adaptive processes within organizations combining their members' intuition (Mirvis, 1998) and minimal organizational structure (Kamoche, Cunha, and Cunha, 2003), renewing old interest in adhoc or emergent processes (e.g., Burgelman, 1983; Mintzberg and McHugh, 1985).

Despite its potential, improvisation has been the focus of very few empirical studies in marketing and strategy, examining the occurrence and value of improvisation in the area of product innovation (Moorman and Miner, 1998b; Eisenhardt and Tabrizi, 1995). I seek to extend this body of research by addressing its following gaps. First, although prior research has explored the memory-improvisation relationship, it has failed to explore the multifaceted impact of organizational memory depending on its *type*. Specifically, research on organizational memory suggests different knowledge stocks—procedural and declarative memory--with potentially

varying effect on the value of improvisation (Moorman and Miner, 1998a). In addition to information stocks, prior research has recognized that information flows are equally important in the innovative process (Cohen and Levinthal, 1990; von Hippel, 1988). It is however unclear whether the *sources* of information flows (e.g., external vs. internal) have the same moderating impact on the value of improvisation.

2 CONCEPTUAL FRAMEWORK

2.1 Improvisation

Building on Moorman and Miner (1998a,b), improvisation is defined as the convergence of planning and execution at the organizational level. This definition has two important ramifications. First, my definition draws on prior definitions that emphasize action without prior planning. "Improvisation deals with the unforeseen, it works without a prior stipulation, it works with the unexpected" (Weick, 1998: 544). In contrast, forecasting, a standard planning tool in the business strategy and marketing strategy theory (e.g., Kotler, 1994), involves planning occurring first, followed by its implementation. As Barrett put it (1998:617), improvisation involves "jumping into action without clear plans, making up reasons as they proceed, discovering new routes once action is initiated, proposing multiple interpretations, navigating through discrepancies, combining disparate and incomplete materials and then discovering what their original purpose was". The prior definitions, though illustrative, do not allow empirical investigation. To overcome this problem, I follow in the tradition of Moorman and Miner (1998a) that stresses the temporal order between planning and execution is the criterion for defining improvisation.

Second, improvisation occurs at many levels ranging from individuals, groups to entire organizations. Although the nature of individual or organizational nature remains open (Walsh, 1995), I follow other work describing organizational features, such as memory (Walsh, 1995; Walsh and Ungston, 1991) and standard operating procedures (Levitt and March, 1988) to study improvisation at the organizational level. This approach suggests that individual improvisation alone is not sufficient for collective improvisation. Instead, the joint activities of individual people create a collective system of improvisational action in nature (Kamoche et al., 2003; Moorman and Miner, 1998a).

2.2 Hypotheses

I examine, in the form of predictions, the moderating role of knowledge stocks (i.e., organizational memory) and information flows sources on the impact of improvisation on three new product outcomes: *short-term financial performance*, *product timeliness*, and *product novelty*.

Information flows sources. New product teams can acquire market information from two different *sources*--sources internal or external to them. *Internal market information flows* occurs when a firm relies on internal sources including managers or units from various divisions, functions, or levels in the focal firm (Bierly and Charkrabarti, 1996). *External market information flows* refers to the extent to which the firm relies on external sources involving customers or lead users (Slater and Narver, 1995; von Hippel, 1988), benchmarking competitors (e.g., Day, 1994; Jaworski and Kohli, 1993), and hiring outside experts (Huber, 1991).

In absence of prior planning, internal market information flows substitutes coordination and it is easy to access (Moorman and Miner, 1998b) increasing the financial success and timeliness. Internal information, however, can reinforce the established marketing thinking and strategy producing incremental improvements to satisfy customer needs (Slater and Narver, 1995) and eventually to "competency traps" (Levitt and March, 1988). External market information flows, on the contrary, can improve novelty and financial success because it allows the new product team to tap diverse ideas from external parties to fit the product the market conditions. A disadvantage of external information is hat it may take time to collect and interpret hurting the effect of improvisation on timeliness. I propose that:

H_1: The greater the level of internal information flows, the greater the likelihood that improvisation will promote (a) timely, (b) financially effective, (c) but less novel products.
H_2: The greater the level of external information flows, the greater the likelihood that improvisation will promote (a) financially effective and (b) novel products but (c) less timely products.
Organizational memory. Following Anderson (1983), I distinguish two forms of organizational memory: declarative and procedural memory. Procedural knowledge refers to the degree to which the firm relies on standard operating procedures and routines which, in the context of new product development take, the form of skills and routines such as team cooperation routines, project milestones routines, product launch skills, etc. Declarative memory is "memory for facts, events, or propositions" (Anderson, 1983; Cohen, 1991:137), and it is of a more general nature. In the context of new product development, it includes, for example, knowledge of customer preferences, competitor pricing policies, or technical expertise (Lynn and Akgun, 2000), or know-why (Kogut and Zander, 1992). Procedural memory impairs the effect of improvisational action on novelty because, firms tend to use fine-tuned routines and processes automatically warning against possible impediments to creative thinking (Day, 1994;). On the other hand, routines and standard approaches can speed up actions and generate financially effective outcomes because they reduce search costs, focus attention, and limit politicking (Walsh and Ungston, 1991).
Declarative memory has a positive impact on the value of improvisation for novelty and financial success because "a critical dimension of declarative memory is the variety of uses to which it can be put [like]…making sense out of new situations, deriving meaning from unstructured situations, or using principles to predict outcomes" (Moorman and Miner, 1998:710). In contrast, improvisation will produce less timely actions because declarative stocks of knowledge tend to be abstract, slowing down their application in a specific situation. Thus, I posit:
H_3: The greater the level of declarative memory, the lower the likelihood that improvisation will promote (a) timely, but the greater the likelihood that it will promote (b) financially effective, and (c) novel products.
H_4: The greater the level of procedural memory, the greater the likelihood that improvisation will promote (a) timely, (b) financially effective, and the lower the likelihood that will promote (c) novel products.

3 METHODS AND ANALYSIS

3.1 Research setting
A random sample of the 500 Dutch food enterprises was drawn from a business directory. After eliminating firms that indicated that they did not engage in new product development activities, the overall sample was reduced from 500 to 340. Finally, of the eligible sample, 138 (41%) returned the questionnaire. The questionnaire asked participants (division or marketing managers) to focus on their products for which their SBU is responsible the last twelve months.
3.2 Measures
The study relied on existing scales for measuring the constructs of new product outcomes (Moorman, 1995. I adapted prior scales of memory (Moorman and Miner, 1997, 1998b) to reflect the ideas of Anderson (1983), Singley and Anderson, (1989), and Cohen and Bacdayan (1994) of procedural and declarative memory. I also developed new scales for external and internal information flows. Finally two control variables were included: market turbulence and competitive intensity based on Kohli and Jaworski (1993) to account for the effects of the environment. The scales were purified and then tested for their reliability and discriminant validity. Table 1 contains a correlation matrix of all measures and their statistical properties.

Table 1: Correlation matrix of measures in the study[1]

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Improvisation	*.84*									
Procedural Memory	-.14**	*.69*								
Declarative Memory	-.23*	.14**	*.86*							
Internal Information	.05	.09	.18*	*.75*						
External Information	.01	.32*	.37*	.17*	*.66*					
Competitive intensity	.01	-.07	-.06	.04	-.06	*.73*				
Market Turbulence	.01	.14**	-.05	.19*	.33*	-.01	*.65*			
Creativity	.01	.08	.14**	-.09	.29*	-15**	.13**	*.72*		
Finan. Performance	-.08	.08	.42*	.25*	.30*	-.21*	.26*	.26*	*.89*	
Timeliness	.02	-.02	.30*	.20*	.16*	-.20*	.03	.24*	.45*	*.87*

* p < .05 ** p < .10 [1]: the reliabilities are indicated diagonally in italics

3.3 Analysis and results

To test the impact of moderators on the improvisation-product outcomes relationships, the split group analysis was performed (Arnold, 1982). This approach involves creating high and low levels for each moderator by performing a median split. The relationship between improvisation and product outcomes is then examined in the high and the low moderator conditions (Pedhazur, 1982). Then the differences in the beta coefficients are tested in t-test to find evidence of moderation. For all models, the assumptions of ordinary least squares were examined. Table 2 contains the results of the split group analyses.

Table 2: Factors moderating the impact of improvisation on new product outcomes

	Timeliness			*Financial performance*			*Novelty*		
	High	*Low*	*t-values*	*High*	*Low*	*t-values*	*High*	*Low*	*t-values*
Procedural Memory	.01	.081	-.687	-.059	-.047	-.071	-.08	.325	-3.588*
Declarative Memory	-.105	.232	-2.313*	.103	-.059	1.004	.116	.054	.538
Internal Information	.108	-.111	1.615**	.060	-.225	1.718*	.173	-.022	1.698**
External Information	-.05	.06	-.724	.07	-.189	1.797*	-.09	.17	-2.376*

Note: beta-coefficients are given * p < .05 ** p < .10

4 DISCUSSION

Based on previous research, I have conceived and tested a number of factors influencing the value of improvisation in the context of new product development. The conceptual framework and the empirical investigation have produced several key findings whose implications for practice and theory I discuss in this section.

4.1 The impact of improvisation on new product outcomes

Timeliness. The data analysis generated three major findings. First, declarative memory reduces the positive impact of improvisation on timeliness. This result is different from what Moorman and Miner found (1998b). One probable explanation is that they did not measure the impact of declarative memory but that of memory in general.

Secondly, internal information flows positively moderate the effect of improvisation on timeliness. This finding refines prior claims about the role of information flows by stressing the importance of information from *internal* parties. In contrast with the market orientation research,

that emphasizes the value of acquisition of external information (Day, 1994; Jaworski and Kohli, 1993), my research shows that firms could gain time advantages by nurturing extensive internal communication across projects, departments, and divisions.

Short-term financial performance. In presence of rich internal information flows, improvisational product development actions lead to financial successfully products. This finding augments previous conceptual work concerned with the financial performance-improvisation relationship. It is consistent with previous work (Brown and Eisenhardt, 1997) claiming that successful new product project portfolios rely on improvisation associated with extensive internal communication. Because my study, unlike their study, which drew on case study material of computer firms, is the first empirical study to measure this relationship in a different industry and country, it strengthens and extends their finding.

Novelty. External information flows and procedural memory prevent improvisation from facilitating product creativity. While the latter finding confirms prior theoretical speculations (Moorman and Miner, 1998a), the impact of the former is somewhat counterintuitive. Prior marketing (Jaworski and Kohli, 1993) and new product development (von Hippel, 1988) literature has stressed the positive effect of external information flows on creative problem solving. Perhaps, as other research (Slater and Narver, 1995) indicates, external information does not always "encourage sufficient willingness to take risks… by narrowly focusing market intelligence efforts on current customers and competitors, thus, ignoring emerging markets and/or competitors'' (p. 67). In support of this idea, Brown and Eisenhardt (1997) found that external information, based on soft data (e.g., direct contact with customers, small experiments, futurists, and strategic alliances), is positively associated with effective improvisation. Somewhat counterintuitive, internal information convert improvisational action into novel outcomes.

4.2 Future Research Directions and Study Limitations

Additional research could formally examine and clarify the role of external information. For example, researchers could theorize whether the type of external information (formal market intelligence vs. soft data through lead-user or empathic design) affects the value of improvisation as was just implied. Given the alleged relationship between improvisation and learning (Miner, Bassoff, and Moorman, 2001), it could be also fruitful to examine whether and which type of external information make improvisational actions exploratory or exploitative in learning (March, 1991). For example, Brown and Eisenhardt's work (1997) hints on a positive impact of soft external information on improvisation-exploratory learning relationship. It would be also fruitful to examine whether the project newness (radical vs. incremental) and the product lifecycle (introduction vs. maturity phase) moderate the effect of improvisation on new product outcomes.

In addition to examining the moderators and the outcomes of improvisation, further research could examine the impact of many of these moderators on the incidence of improvisation. For example, one could examine whether the incidence of improvisation varies as a function of internal vs. external information, market vs. competitive turbulence, and declarative vs. procedural memory. Beyond further conceptual work, the current work can be improved by addressing some methodological aspects. For example, measuring the new product outcomes at a later point of time could address potential biases arising from the cross sectional nature of the current study. Using secondary data to measure new product outcomes and direct observation of the planning and implementation phase to measure improvisation would also add to the validity of research, by removing social desirability and biases associated with the subjective data of this paper.

APPENDIX

I. Improvisation (Moorman & Miner 1998b)

- Figured action as we went along - Action followed a strict plan as it was taken
- Improvised in carrying out this action - Strictly followed our plan in carrying out this action
- Ad-libbed action - Not an ad-libbed action

II. Organizational Memory (adapted from Moorman & Miner 1998b)

For this action, my team has:

Procedural Memory

- well-defined procedures
- a standard approach
- strong skills*

Declarative Memory

- a great deal of knowledge
- strong expertise
- knowledgeable people*

III. Environmental Turbulence

Market Turbulence (Jaworski & Kohli 1993)

- In our kind of business, customers' product preferences change quite a bit over time.
- Our customers tend to look for new product all the time.
- We are witnessing demand for our products and services from customers who never bought them before.
- New customers tend to have product-related needs that are different from those of our existing customers.

Competitive Intensity (Jaworski & Kohli 1993)

- Competition in our industry is cutthroat
- There are many "promotion wars" in our industry
- Anything that one competitor can offer, others can match readily.
- Price competition is a hallmark of our industry.
- One hears of a new competitive move almost every day.
- Our competitors are relatively weak.

IV. Information flows sources

Internal Information flows

During this project, we:

- regularly received market information i.e., customer needs, competitive action, from other teams.
- systematically received information about market changes from various departments.
- systematically collected information on market developments from other concurrent projects.
- were kept regularly informed from other sites of our company about market developments.
- regularly were updated by Customer service people.
- regularly updated by Salesforce people.

External Information Flows (new scale)

During this project, we:

- systematically discussed with our customers.
- regularly consulted our supply chain partners.
- systematically contacted our alliances.
- regularly discussed with external consultants.
- studied systematically successful companies outside our industry.*
- consulted regularly outside experts.*

V. New product outcomes (Moorman 1995)

Rate the extent to which the product has achieved the following outcomes during the first twelve months of its life in the marketplace.

New Product Timeliness

- Timely – Untimely
- Opportune – Inopportune
- Well timed - Poorly timed

New Product Creativity

- Very novel for this category - Very ordinary for this category
- Challenged existing ideas for this category - Did not challenge existing ideas for this category
- Offered new ideas for this category - Did not offered new ideas for this category
- Creative – Not Creative

New Product Short-term Financial Performance

- market share relative to its major competitor
- sales relative to its major competitor
- return on assets relative to its major competitor
- profit margin relative to its major competitor
- return on investment relative to its major competitor

* Deleted items

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