

# Do Formal Management Practices Impact the Emergence of Bootlegging Behavior?\*

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*Innovation in an organization often relies on initiatives by employees who take action to develop their ideas and obtain buy-in by organizational decision-makers. To achieve this, employees sometimes apply unorthodox approaches, ignoring formal structures to further elaborate their ideas' potential and promote their implementation. They work without formal legitimacy and gather their own resources until sufficient clarity allows for informed decisions. Finally, they bypass formal communication channels to convince top management of the merits of their ideas. Despite the significance of such bootlegging behavior, research has barely addressed the antecedents of this deviance.*

*Drawing on strain theory and social cognitive theory, we study whether the emergence of bootlegging behavior is influenced by formal management practices, in particular, strategic autonomy, front-end formality, rewards, and sanctions. Additionally, we investigate the role of employees' self-efficacy related to innovation tasks at the entrepreneurial stage to explain the emergence of bootlegging. We tested the proposed relationships with empirical field survey data using structural equation modeling. In summary, this paper concludes that intrapreneurial self-efficacy, strategic autonomy, and rewards for innovation accomplishments foster bootlegging. Front-end formality has a positive effect on bootlegging by increasing intrapreneurial self-efficacy, but it reduces the likelihood that employees will ignore formal structures when promoting their ideas and gathering their own resources to support their bootlegging efforts.*

## Introduction

Prior research finds empirical evidence that entrepreneurship in established organizations improves performance in terms of growth and profitability in both small-to-medium-sized and large companies (Antoncic, 2007; Zahra and Covin, 1995). Thus, it is reasonable for managers to pursue a strategy of relying on entrepreneurial behavior that rejuvenates their organizations and the scope of their operations by recognizing and exploiting opportunities, which are manifested through an entrepreneurial strategic vision, a pro-entrepreneurship organizational architecture, and entrepreneurial processes and behavior (Ireland, Covin, and Kuratko, 2009). Because it is the individuals within an organization who innovate, and not the organization itself (Krueger, 2000), it is important to know how individual behavior promotes entrepreneurship (Hayton, 2005; Zahra, Jennings, and Kuratko, 1999). One particular area that deserves more attention is that employees sometimes revert to unorthodox approaches, temporarily

ignoring formal rules, procedures, and monitoring systems to elaborate their ideas in the early stages (Burgelman, 1983; Kanter, 2000). This behavior is referred to as *bootlegging* and is the focus of our research. Bootlegging activities occur when employees engage in predevelopment activities without official mandates or supervisory control (Augsdorfer, 1996), provide their own resources to remain unnoticed during the exploratory phase, and bypass formal communication channels when promoting their ideas (Howell and Higgins, 1990). It is essential to distinguish bootlegging from “permitted bootlegging” (Augsdorfer, 2008), which explicitly allows privileged employees to dedicate a specific amount of work time to develop their own ideas.

Organizations may consider regulating this specific deviant form of employees' entrepreneurship behavior to protect the efficiency and effectiveness of planned innovation activities. However, bootlegging activities take place “underground” and therefore are difficult to control through managerial measures.

This research investigates the impact of organizational factors on bootlegging. It is possible that practices that are intended to promote employees' compliant innovative behavior do not affect employees' deviant bootlegging, or paradoxically that they even stimulate bootlegging at the same time. Thus, the first research question that arises is: What is the influence of organizational factors on the

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emergence of employees' bootlegging behavior? We address this question by building on the literature on employees' entrepreneurship behavior and on deviant behavior to develop and empirically test hypotheses about the impact of four formal management practices—namely, strategic autonomy, front-end formality, rewards, and sanctions—on different aspects of bootlegging behavior.

To identify a method of regulating deviant behavior, it is also essential to know about the relevance of individual characteristics. Recent research suggests that employees need to feel capable and motivated to act entrepreneurially (e.g., Goldsby, Kuratko, Hornsby, Houghton, and Neck, 2006; Morrison and Phelps, 1999; Speier and Frese, 1997). Thus, an employee's self-efficacy (Bandura, 1997) related to innovation tasks at the front end (subsequently referred to as intrapreneurial self-efficacy) may explain the emergence of bootlegging. Furthermore, scholars indicate the dependence of self-efficacy on factors in the work environment (e.g., Parker, Williams, and Turner, 2006). Hence, we must know whether formal management practices build or undermine self-beliefs and thereby exert an indirect side effect on bootlegging. The second arising research question is: Does employees' intrapreneurial self-efficacy influence the emergence of bootlegging, and do organizational factors have an impact on intrapreneurial self-efficacy? We address this question by building on social cognitive theory to develop hypotheses about the interactions between the previously mentioned formal management practices, intrapreneurial self-efficacy, and bootlegging.

Based on our empirical results, we find that both organizational factors and individual characteristics affect

bootlegging. In particular, intrapreneurial self-efficacy, strategic autonomy, and rewards for innovation accomplishments foster employees to engage in bootlegging, to bypass official communication channels, and to provide their own resources for idea elaboration. Furthermore, front-end formality has a positive effect on bootlegging by increasing intrapreneurial self-efficacy, but it reduces the likelihood that employees will ignore formal structures when promoting their ideas and gathering their own resources to support their bootlegging efforts.

## Bootlegging Behavior and Its Organizational Antecedents

Bootlegging is usually self-initiated from the bottom up, is not part of the organization's research and development program, and may even ignore management directives (Augsdorfer, 1996). Employees elaborate their ideas by transforming and refining them to gain further insight into their feasibility and potential. These activities include developing early-stage prototypes; engaging in market-related and business-planning tasks; and making efforts to communicate with potential customers, suppliers, and technologists (Augsdorfer, 2005; Howell and Higgins, 1990). Because these activities are not legitimized by the organization, the employees lack formal access to resources such as work time, materials, and equipment. To elaborate their ideas in the absence of such resources, employees often gather their organizations' hidden or forgotten resources, thus generating their own resources (Burgelman, 1983). If their bootlegging activities prove the potential of an idea, the employees must promote it and convince others in the organization to carefully consider the idea (again) to ensure that it is further exploited within the formal innovation process.

Contemporary research lacks consensus as to whether bootlegging should be considered to be desirable or undesirable. On the one hand, bootlegging may be considered to be positive. Organizations that have many ideas do not have the resources to sponsor all of them and must select a subset for further elaboration (Mainemelis, 2010). By tolerating bootlegging, an organization may expand its capacity to elaborate further ideas (Augsdorfer, 2005). Further information about an idea's feasibility and potential also enables a more informed selection decision at a later stage and thus avoids a premature evaluation of an embryonic idea (Koch and Leitner, 2008; Masoudnia and Szwejcowski, 2012). Thereby, bootlegging may also help to overcome the problem that highly innovative ideas tend to be systematically rejected when evaluated

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against objective criteria such as expected returns and strategic fit due to their fuzziness, higher risk, and organizational misfit (Ahuja and Lampert, 2001).

On the other hand, self-organized allocation of resources may cause several problems. Authorized projects may be delayed because employees are pursuing their own ideas and thus cannot manage the workload of their own assigned projects (Roussel, Saad, and Erickson, 1991). Furthermore, if available laboratory time and material are used for unauthorized work, efficiency losses in the innovation process are likely. If an organization has installed an appropriate innovation management structure, excessive bootlegging may cannibalize its efficiency and effectiveness (Burgelman and Grove, 2007) and may result in an inconsistent innovation portfolio (Kanter, 2000). Taken together, if an innovation management system and process are in place, bootlegging should be an exceptional case, which may compensate for structural shortcomings such as systematic idea selection biases or bureaucratic barriers.

### *The Deviance of Bootlegging Behavior*

Employee behavior that ignores formal and informal rules and policies is referred to as deviant behavior. The organizational literature differentiates between: (1) destructive deviance, which violates both organizational and higher order norms and typically harms the organization; (2) constructive deviance, which violates organizational norms but conforms to higher order social norms and values (Warren, 2003). Recent research understands constructive deviance as an umbrella term that also encompasses behaviors such as taking charge and issue selling (Vadera, Pratt, and Mishra, 2013). Mainemelis (2010) establishes a third category of deviant behavior, creative deviance, which describes an employee's attempt to pursue new ideas in an illegitimate manner. Creative deviance also violates organizational norms but, instead of following higher order norms, it aims to achieve organizational innovation goals. Thus, bootlegging is a form of creative deviance.

Merton's (1968) strain theory proposes that specific organizational conditions exert pressure to engage in deviant behavior and that deviant behavior is a "normal" response to a specific setting of goals and norms. Goals are a social system's legitimate and promoted objectives. Norms define and regulate the means for achieving these goals. Given that the members of a social system adopt its goals, they try to achieve those goals in accordance with social norms, provided that they have access to legitimate means of doing so. If they lack access to legitimate

means, they engage in deviant behavior to achieve the goal by illegitimate means. Deviance is generally more likely when the system promotes a goal but lacks resources for achieving that goal by legitimate means—a situation that is also referred to as structural strain. Mainemelis (2010) applies this theory in the specific context of idea elaboration. Organizations encourage employees to generate ideas through formal and informal communication, rewards, idea suggestion systems, etc., to pursue their goals. However, the further elaboration of ideas also demands resources, which are usually insufficient to sponsor every idea (Staw, 1990). Therefore, management selects which ideas are further nurtured and which are not. Structural strain is then created when innovation goals are promoted and idea generation is encouraged, but there is a lack of resources to elaborate every emerging idea. This situation may exert pressure on employees to engage in deviant creative behavior to achieve their goals by illegitimate means (Mainemelis, 2010). From this perspective, bootlegging is the response of an employee within an organization that seeks innovation but provides limited resources for idea elaboration.

Drawing on strain theory and creative deviance theory, we assume that formal management practices affect bootlegging: (1) by their impact on employees' motivation to strive for new ideas, (2) by influencing idea rejection through formal selection mechanisms, and (3) by determining the degree to which employees have the necessary resources that enable them to actually engage in deviant behavior in high-pressure situations.

### *Research on Organizational Antecedents of Deviant Entrepreneurial Behavior*

Based on prior research, Hornsby and colleagues identify five factors driving corporate entrepreneurship at the organizational level, namely: (1) top management support to facilitate and promote employees' entrepreneurial actions; (2) employees' work discretion to have the autonomy and freedom to explore new paths in workplaces that also have a tolerance for failure should it occur; (3) rewards to encourage entrepreneurial behavior and risk taking; (4) time availability to pursue innovations; (5) organizational boundaries in terms of an organization's explicit outcome expectations and mechanisms for evaluating, selecting, and implementing ideas (Hornsby, Kuratko, and Montagnano, 1999; Hornsby, Kuratko, and Zahra, 2002). No study has yet investigated the relationship between these organizational factors and bootlegging. However, Hornsby et al. (1999) and Kuratko, Hornsby, and Bishop (2005), who have

investigated a broad set of entrepreneurial behaviors, have found that the amount of employees' unofficial improvements without organizational approval increases with higher management support that facilitates and promotes employees' entrepreneurial actions, with providing more work discretion, and with setting higher organizational boundaries in terms of clear goals and process guidelines. They have not found support that rewards or time availability have an impact on the amount of unofficial improvements. Furthermore, Hornsby et al. (1999) report that the frequency with which procedures are bypassed to pursue an idea increases with more management support, higher work discretion, and more rewards, whereas the availability of time resources and organizational boundaries have no impact. In summary, these results suggest that the emergence of creative deviance is dependent on the organizational context.

### *Formal Management Practices and Bootlegging Behavior*

To investigate the impact of organizational factors on the emergence of bootlegging behavior, we focus on a subset of formal management practices which are directly related to employees' execution of front-end activities. We thereby avoid difficulties in explaining and analyzing their effects on bootlegging caused by broad factor definitions, which is an issue in the prior research described above. The investigated formal management practices capture central aspects of: (1) formal job design by the degree of strategic autonomy, (2) institutionalized process design by the formality of the front end, and (3) organizational extrinsic motivators by both rewards and sanctions for innovative outcomes.

*Strategic autonomy* refers to the degree of independence and discretion that employees have in their jobs to choose the problems that they want to work on (Bailyn, 1985). In the context of employees' entrepreneurship behavior, this is the freedom to carry out innovative activities without supervisory approval, even if they are not closely related to the organization's current strategic scope. Strategic work autonomy is considered to be a formal management practice because it is regulated by the job description or by a formally higher authority.

Burgelman (1983) notes that serious problems with autonomous initiatives arise out of their missing legitimization, which leads to a lack of resources and the need for temporarily neglecting administrative structures. The prior literature has recognized autonomy as a precondition for employees to respond to structural strain with creative deviance because it provides them with the nec-

essary practical and psychological requirements to do so (Mainemelis, 2010). With respect to practical requirements, employees with higher autonomy can allocate their own resources (e.g., time) to their idea-elaboration activities and usually have better access to organizational resources (Keltner, Gruenfeld, and Anderson, 2003). Higher levels of autonomy provide employees with more personal discretion for deviant behavior, whereas close monitoring inhibits activities outside organizational norms (George, 2007). Thus, an employee needs at least some degree of work autonomy to engage in bootlegging behavior. From a psychological perspective, employees view autonomy as the ability to choose what they work on (Marvel, Griffin, Hebda, and Vojak, 2007). High influence over a broader range of decisions supports the development of psychological ownership of these decisions (Parker et al., 2006), which builds enthusiasm, firm commitment, and intrinsic motivation to perform the corresponding tasks (Amabile, 1996). Employees with higher autonomy also tend to perceive more potential returns and are willing to take more risk compared to their peers with lower autonomy (Keltner et al., 2003). Because the outcomes of bootlegging activities are uncertain and disobeying organizational norms involves personal risk, higher strategic autonomy supports employees in developing a better attitude and stronger motivation for this deviant behavior.

Prior empirical research supports this positive effect of work autonomy for compliant innovative behaviors, such as idea suggestion (Axtell et al., 2000) and proactive work behavior (Parker et al., 2006), and for the constructive deviant behavior championing of innovation projects, which describes employees' efforts to promote the realization of innovation projects (Howell and Higgins, 1990). In the context of creative deviant behaviors, Hornsby et al. (1999) and Kuratko et al. (2005) report a positive correlation between work discretion and the number of unofficially implemented improvements. Thus, we propose:

*H1: Strategic autonomy is positively related to bootlegging behavior.*

*Front-end formality* describes the intensity of formal mechanisms by which ideas for innovations are explored, developed, and selected (Burgelman and Sayles, 1986). These mechanisms are intended to direct employees' actions and decisions through organizational control, which is established by setting process standards, rules, and institutional responsibilities (Cardinal, 2001).

If an organization were to have unlimited resources, employees could elaborate all of their ideas by regular

means. However, organizations usually operate with scarce resources, and it is impossible for them to sponsor the elaboration of all of their employees' ideas (Staw, 1990). Such organizations need formal control mechanisms to manage and select initiatives efficiently to ensure that employees' entrepreneurial behavior actually increases their performance (Goodale, Kuratko, Hornsby, and Covin, 2011). Therefore, there are three primary reasons that organizations establish formal processes: (1) formality helps them to increase efficiency by prescribing a proven course of action and by closely monitoring all activities to ensure their efficient execution; (2) predefined evaluation criteria supports organizations in selecting the most promising and strategic best fitting ideas, which can then be appropriately funded and implemented in a timely manner (Cooper, 2006); (3) a formal front-end process signals employees that generating and submitting ideas are expected and supported behaviors within the organization. Improving and promoting the formal front-end process results in more ideas and a higher rejection rate, which will strengthen structural strain. This may exert pressure on employees to respond to a bottleneck in the front-end process by engaging in bootlegging behavior so that they can further elaborate their ideas (Mainemelis, 2010). Employees may decide to "go underground" after their ideas have been rejected at the first decision gate or even before an idea is brought to the attention of organizational decision-makers.

For constructive deviant behaviors, the empirical results are mixed. Markham and Griffin (1998) do not support an impact of formality on championing innovation projects. Dutton, Ashford, O'Neill, Hayes, and Wierba (1997) and Dutton, Ashford, O'Neill, and Lawrence (2001) find that the emergence and success of issue selling, which describes employees' communication efforts to shape change from below by directing the attention of top management, are higher in the face of rules and timing. Empirical research on compliant behaviors reports a positive effect of formality. Ohly, Sonnentag, and Pluntke (2006) find a positive impact of routinization on workplace-related creativity and implementing innovative ideas. Marvel et al. (2007) identify the absence of formality as demotivating technical corporate entrepreneurs. Thus, we propose:

*H2: Front-end formality is positively related to bootlegging behavior.*

*Rewards* refer to the personal positive consequences provided by an organization following innovation accomplishments. Rewards can be in financial form, such as bonuses and options, or in nonfinancial form, such

as awards and compensatory time off (Feldman, 1996; Griffin, 1997). Therefore, this research focuses on rewards for successful innovative outcomes and not on performance-independent rewards given for simply participating, regardless of whether the innovative behavior has produced a valuable outcome (Deci and Ryan, 1985).

If organizations want to achieve their goals, they need to encourage their employees to strive for them (Merton, 1968). One way to align employees with organizational goals is to provide appropriate rewards. Eisenberger and Cameron (1996) show that rewards for results enhance intrinsic motivation. In the context of creativity, rewards increase the desirability of achieving the goal for which the reward is granted, which strengthens the employee's goal commitment and self-imposed performance pressure. This fosters intrinsic task motivation and departure from routines (Eisenberger and Aselage, 2009). However, rewards only raise intrinsic motivation when they signal recognition instead of behavioral control (Baer, Oldham, and Cummings, 2003; Burroughs and Dahl, 2011). Furthermore, rewards indicate that an organization values a specific behavior and affects individuals' attitudes toward that behavior (Bandura, 1986). If innovative behavior is recognized and rewarded, it becomes a salient overall goal directing all employees' attention toward innovation (Scott and Bruce, 1994) and employees perceive themselves to be in control of the organization's innovation success (Eisenberger and Aselage, 2009).

If appropriate rewards motivate employees to innovate, the number of available ideas increases. Because the organizational resources for elaboration are still scarce, rewards strengthen the emergence of a structural strain, which in turn makes bootlegging behavior more likely. Thus, the encouragement of idea generation is an essential antecedent of structural strain, which causes creative deviance (Mainemelis, 2010). Because outcome-based rewards do not differentiate between innovation goals that are achieved through compliant or deviant behavior, they do therefore not prohibit illegitimate means. Thus, we propose:

*H3: Rewards for innovation accomplishments are positively related to bootlegging behavior.*

*Sanctions* describe negative consequences in case of failure, which can be formal, such as a subsequent restriction in autonomy or position degradation, or informal, such as losing face among peers (Kahn, 1990). They indicate a low failure tolerance for innovation activities within an organization by treating failure as a result of incompetence and dereliction rather than experimentation and learning. Failure tolerance is important so that

employees face relatively few risks when innovating and being unsure of the outcomes (Tushman and Nadler, 1986). Similar to its approach to rewards, this research focuses on sanctions that are applied for negative outcomes of innovation activities and not for violating organizational norms.

Prior research reports that entrepreneurial employees worry most that failure will have an impact on their careers (Marvel et al., 2007). Sanctions are related to a lower number of proposed ideas (Baer and Frese, 2003) and in the context of deviant behavior, the presence of image and reputation risk is also found to inhibit employees' issue-selling efforts (Dutton et al., 1997). The presence of sanctions may not prohibit creative deviance; it may even foster activities focused on risk reduction. Employees may prevent visible failure by avoiding official funding of their elaboration activities, instead providing their own resources. While ideas are still vague, unstable and vulnerable, employees can refine and test them by bootlegging, which will go unnoticed if the ideas go nowhere. Before making ideas public, they can also start internal discussions with other confidants instead of direct supervisors. This argument is supported by March and Shapira (1987), who recognize that in the face of high risk, managers engage in activities to systematically reduce uncertainty rather than immediately rejecting risky opportunities. Thus, we propose that sanctions for innovation failure foster the emergence of bootlegging behavior for the purpose of risk reduction.

*H4: Sanctions for innovation failure are positively related to bootlegging behavior.*

## The Role of Intrapreneurial Self-Efficacy

Self-efficacy refers to the belief in one's ability to exercise control over events and to achieve goals independently (Bandura, 1986). Highly self-efficacious people have higher intrinsic task motivation because they set higher goals for themselves and have firmer commitments to them. They also exert greater effort to master challenges and show more persistence in the face of obstacles (Bandura, 1997; Wood and Bandura, 1989). They accept higher levels of risk, frame opportunities more positively, and tend to anticipate success rather than failure (Krueger and Dickson, 1994; Mitchell and Shepherd, 2010; Mohammed and Billings, 2002).

This study investigates *intrapreneurial self-efficacy*, which describes the belief in one's capabilities to perform tasks associated with innovation initiatives in the early entrepreneurial stage of the innovation process. Employ-

ees with high intrapreneurial self-efficacy are more likely to engage in bootlegging than are their low self-efficacious peers. They believe in their ability to successfully elaborate their ideas even without their organization's formal support, and to later obtain buy-in by organizational decision-makers. Therefore, they are more likely to choose illegitimate execution paths because they accept higher levels of risk. Furthermore, they will also be more successful in their activities because they invest greater effort as a result of their stronger commitment and intrinsic motivation for intrapreneurial tasks.

Empirical research supports self-efficacy as having a positive impact on compliant innovative behaviors such as idea submissions (Axtell et al., 2000) and on constructive deviance such as taking charge (Morrison and Phelps, 1999) and personal initiative (Speier and Frese, 1997).

*H5: Intrapreneurial self-efficacy is positively related to bootlegging behavior.*

Social cognitive theory suggests that self-efficacy is formed based on skills and their successful application but is also influenced by situational constraints (Bandura, 1997). Formal management practices are potential sources of such constraints.

Self-efficacy is determined by the perceived controllability of a situation. Thus, the degree of independence necessary to perform a specific task is particularly taken into consideration (Gist and Mitchell, 1992). Employees who have discretion over core aspects of their assigned tasks perceive themselves as having control over future results (Bandura, 1997) and as having the capability to influence others to see things as they do (Lee and Ofshe, 1981). Recent research supports this positive effect of autonomy at work on self-efficacy (Axtell and Parker, 2003; Parker et al., 2006; Speier and Frese, 1997). Accordingly, we propose that strategic autonomy strengthens intrapreneurial self-efficacy.

If an organization has a formal front-end process with defined work packages, task descriptions, and deliverables (e.g., Cooper, 2006), employees have clear guidance for elaborating their ideas in a disciplined way (Goodale et al., 2011), even if employees' activities take place "underground." Self-efficacy increases with the availability of action strategies, which describe the knowledge about how to approach a task (Bandura, 1986). The explicit task descriptions of a formal front-end process are supposed to support the building of action strategies for front-end activities and thus increase intrapreneurial self-beliefs.

Finally, rewards and sanctions indicate whether an individual has succeeded or failed in executing a particular task. Thereby, they signal the appropriateness of individual capabilities and thus influence self-efficacy (Bandura, 1997; Wood and Bandura, 1989). Jourden's (1991) experiments in organizational contexts support this effect on self-efficacy for both financial and reputational rewards. The results of that study also show that positively framed feedbacks about task execution increase goal setting and self-beliefs, whereas in the face of negatively framed feedback, goal levels and self-efficacy decrease. Accordingly, we propose that rewards for innovation accomplishments strengthen employees' self-beliefs and sanctions for innovation failure weaken them. In summary, these arguments suggest that strategic autonomy, front-end formality, and rewards foster bootlegging behavior not only directly but also indirectly through their impact on employees' intrapreneurial self-beliefs.

*H6a: The positive effect on bootlegging behavior of the formal management practices of strategic autonomy, front-end formality, and rewards for innovation accomplishments is partially mediated through intrapreneurial self-efficacy.*

Because intrapreneurial self-efficacy is proposed to facilitate bootlegging, sanctions have an indirect negative effect on bootlegging by diminishing self-efficacy.

*H6b: Sanctions for innovation failure are negatively related to intrapreneurial self-efficacy.*

Taking the direct effect of sanctions proposed in H4 and the mediation effect in H6b together, the positive effect of sanctions on bootlegging is partly reduced or totally disrupted by diminishing intrapreneurial self-efficacy. The empirical analysis will reveal the total effect of sanctions on bootlegging.

## Methods

### *Data Collection and Sample*

We recruited respondents from different organizations and collected data from several employees within each organization to ensure appropriate variances in both organizational factors and the intensity of bootlegging behavior. Similar to prior corporate entrepreneurship research (e.g., Hornsby et al., 2002; Kuratko et al., 2005), we identified individual employees as appropriate information sources for all variables for several reasons: (1) bootlegging behavior is not comprehensively observable by

supervisors or peers, (2) self-efficacy is an estimation of self-beliefs to perform specific tasks and therefore requires a self-report, and (3) individual decision-making about acting entrepreneurially tends to be affected more by the perception of organizational factors than by their actual existence (Kuratko, Hornsby, and Goldsby, 2004; Marvel et al., 2007). Furthermore, applied management practices may not be the same for all employees within a company. Therefore, supervisors would have been required to rate these organizational factors separately for each employee, which would have exceeded their available time and commitment.

Participants were recruited from 200 companies that were randomly selected from the AURELIA database, which is a continuously updated inventory of registered Austrian companies. Local sales offices without research and development departments were excluded because of their limited innovation activities. Two master's of business administration students telephoned top-level managers of the remaining 170 companies. The students informed the managers of the purpose of this research and encouraged them to provide the survey to 10 employees from different functional areas that frequently address issues of creativity. Therefore, the managers were asked not only to pick the "innovation champions" of their organizations but also to select a representative sample of their employees involved in innovation tasks. Thirty-nine companies agreed to participate. The managers were provided with an email that included a survey description and a digital version of the questionnaire. The respondents had the option to return the survey via mail, e-mail, or fax. Between 1 and 10 (mean 2.71) employees per firm responded, and the final sample consisted of 103 participants. Table 1 shows the characteristics of the entire sample. We assessed potential respondent bias with multiple analyses of variance, and the results did not show any significant differences among various firm and individual-level characteristics concerning all variables.

To address common method variance issues, we closely followed the recommendations of Chang, Witteloostuijn, and Eden (2010) and Podsakoff, MacKenzie, Lee, and Podsakoff (2003). We informed the respondents about confidentiality issues, that there are no right or wrong answers, and insisted on honest responses. With respect to the questionnaire, we included fact-based items such as the frequency of specific behaviors and asked respondents to rate the extent to which statements about organizational environments apply to their organizations. Such items are less likely to be associated with bias. Furthermore, the independent and dependent variables also had different scales and formats to reduce

**Table 1. Sample Characteristics<sup>a</sup>**

Firm-Level Characteristics ( <i>n</i> = 39)		Individual-Level Characteristics ( <i>n</i> = 103)	
<b>Industry</b>		<b>Gender</b>	
Industrial electronics	8	Male	82%
Automation engineering	6	Female	15%
Chemical	3		
Timber	3	<b>Age</b>	
Textiles and sports	3	21–30 years	12%
Metal processing	3	31–40 years	44%
Retail	2	41–50 years	31%
Plastics	2	> 50 years	7%
Software and IT	2		
Others	7	<b>Current job position</b>	
		No management responsibility	19%
<b>Employees</b>		Middle management	50%
≤ 100	10%	Senior management	27%
101–250	36%		
251–500	13%	<b>Highest educational level</b>	
501–1000	13%	A-Level	43%
> 1000	28%	Master's degree	44%
		Ph.D.	11%
Average number of respondents per firm	2.71	Average Age (years)	39.22
		Average organization tenure (years)	9.73

<sup>a</sup> Columns shown may not add up to 100% because percentage of n/a is not listed.

biases resulting from commonalities in scale endpoints and anchor effects. We also asked about several other innovative behaviors so that the respondents could not anticipate the actual focus of the study. Finally, our model specified a mediation relationship, which was unlikely to be part of the respondents' theory-in-use, thereby also reducing the likelihood of a mono-method bias.

### Measures

Reflective multi-item measures and 5-point Likert-type scales were used for each construct except for bootlegging behavior. We conducted an extensive literature review to identify established indicators, and the development of additional items closely followed prior research. The measures were pretested by five experts from academia and practice to assure content validity, improve wording, and remove ambiguity. *Strategic autonomy* was measured with three items based on the strategy making (Burgelman, 1991; Mintzberg and McHugh, 1985) and bootlegging literature (Augsdorfer, 1996) that capture whether respondents were allowed to develop ideas outside of the company's strategic scope, initialize new projects without approval, and decide about knowledge creation from external sources. *Front-end formality* was measured by three items from Cardinal (2001), which were modified to fit into the front-end context. *Rewards* was measured using three items

adapted from Cardinal (2001) that capture the extent to which an organization provides incentives for innovative accomplishments. To clarify the general definitions of financial and nonfinancial types of rewards, we added striking examples following Griffin (1997) and Feldman (1996). *Sanctions* captured the extent of formal and informal negative consequences of innovation failure, such as project termination due to unresolved development problems or unmet customer expectations, with two items derived from the literature on the psychological safety of initiative behavior (Baer and Frese, 2003; Kahn, 1990) and issue selling (Dutton et al., 1997). Prior research reports a decreasing predictive power of self-efficacy measures when defined more generally (Zhao, Seibert, and Hills, 2005). Keeping this in mind, we built the *Intrapreneurial Self-Efficacy* scale upon a shortened version of the Entrepreneurial Self-Efficacy Scale of Chen, Greene, and Crick (1998). Five additional items captured the promotion of opportunities based on Dutton et al. (2001) and front-end-specific tasks related to project planning and risk management. Concerning the dependent variable *bootlegging behavior*, we measured the absolute quantity of three different behaviors and tested the proposed effects separately. This approach differs from the commonly used single-factor multi-item scales to measure innovative behaviors (e.g., Criscuolo, Salter, and Ter Wal, 2013; Frese, Kring, Soose, and Zempel, 1996; Scott and Bruce, 1994) by allowing for a



more fine-grained analysis of the organizational factors' impact. Two behaviors adapted from the Entrepreneurial Behavior Scale of Hornsby et al. (1999) assessed how often respondents started projects by bootlegging and bypassed official channels to pursue their ideas. Additionally, we asked how often respondents provided their own resources for idea development. To avoid biases caused by job tenure or memory, these ratings referred to activities within the previous 12 months. For the validity assessment of the self-efficacy scale, we measured *domain familiarity* with three items related to the extent to which innovation activities were part of the respondents' work, and *outcome history* with two items on past innovation performance. Age, organization tenure, current job position, and education were captured as controls.

## Research Results

We calculated the intra-class correlation coefficient (ICC) (Shrout and Fleiss, 1979) to analyze whether formal management practices differ across organizations or according to individual employees. The results show for all constructs a low inter-rater agreement, indicated by ICC scores of .34 for front-end formality, .06 for strategic work autonomy, .33 for rewards, and close to .00 for sanctions. Additional one-way ANOVA to analyze the significance of differences across group means also finds significant differences for front-end formality and rewards. Thus, the results support our theoretical assumption of higher variance at the individual level due to differences in individual perceptions and job designs and confirm that the individual employee is the appropriate level of analysis.

The empirical evidence of the proposed framework was analyzed with partial least squares (PLS) path modeling. PLS was chosen because it fits the main objectives and characteristics of this study better than complementary covariance-based structural equation modeling techniques. First, this research built and tested theory in an early stage of development. PLS is appropriate where not all paths have previously been empirically tested and the measurement instruments in use are new. Second, PLS is especially appropriate when a model is complex and the sample size is comparatively small (Chin and Newsted, 1999; Henseler, Ringle, and Sinkovics, 2009).

### Measurement Model

Internal consistency reliability is demonstrated by composite reliability ranging from .74 to .90 (Hair, Black,

Babin, Anderson, and Tatham, 2006). Reliability of indicators is assessed by the standardized outer loadings  $\lambda$ , which should be above .7, and elimination follows if they are below .4 (Hulland, 1999). All indicators are clearly above .4 and kept. The significance of the loadings was tested using resampling procedure bootstrapping (Efron and Tibshirani, 1993) with 500 subsamples. All of the  $t$ -values are above 1.96 ( $p < .05$ ). The unidimensionality of the construct was tested by conducting explorative factor analyses (i.e., principal components and varimax rotation). For each construct, only one factor with an eigenvalue greater than one was extracted, which supports unidimensionality (Hair et al., 2006). Convergent validity is demonstrated by an average variance extracted (AVE) above .5 for all constructs (Chin, 1998). Discriminant validity at the construct level is supported by the result that the AVE of each latent variable is greater than the highest squared correlation with any other latent variable (Fornell and Larcker, 1981). Additionally, all items have a higher correlation with their corresponding latent variable than with other latent variables, which supports discriminant validity on the indicator level (Chin, 1998). Harman's single-factor test does not indicate common method bias (Podsakoff and Organ, 1986). The correlations of the control variables outcome history and domain familiarity with intrapreneurial self-efficacy are positive and significant ( $r = .34$  and  $r = .50$ ;  $p < .01$ ). The results support a valid measure of intrapreneurial self-efficacy because prior research theoretically assumes (Bandura, 1986; Gist and Mitchell, 1992) and empirically supports these relationships (Zhao et al., 2005). With respect to the controls, the correlations show that employees' demographic characteristics do not play a vital role in bootlegging behaviors. Means, standard deviations, correlations, composite reliability, loadings,  $t$ -values, and AVE are reported in Appendix A and B.

### Main Effect Model

Size, sign, and significance of the path coefficients provide partial empirical validation of the proposed hypotheses (Chin, 1998). The coefficient of determinant  $R^2$  describes the amount of variance explained by the predictors of a dependent variable. Because PLS does not presume normal distribution of the data, significance of the path coefficients is assessed by using bootstrapping (Efron and Tibshirani, 1993). Table 2 and Figure 1 present the results of the main effects.

The results support H1, showing a positive and significant impact of *strategic autonomy* on the three bootlegging behaviors: the number of bootlegged

**Table 2. Results of the Structural Model and Hypotheses Test**

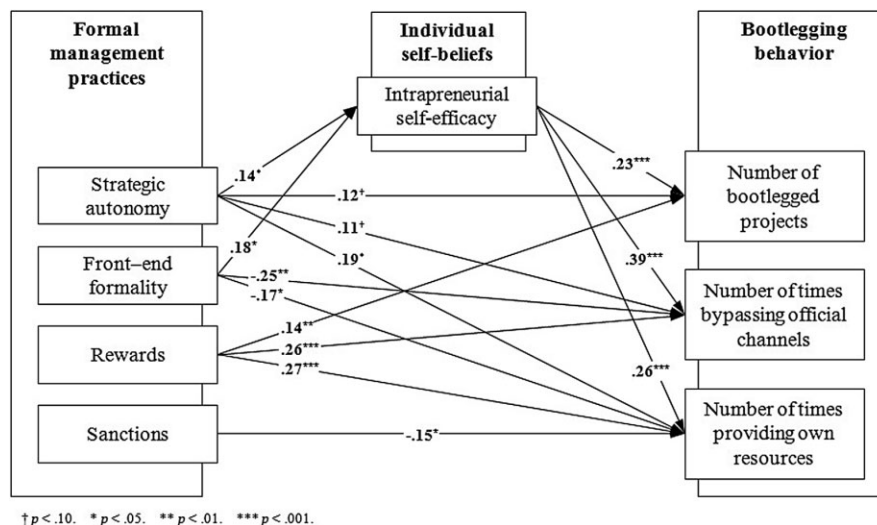
Independent Variable	Path Coefficients and Levels of Significance							
	Intrapreneurial Self-efficacy ( $R^2 = .07$ )		Number of Bootlegged Projects ( $R^2 = .10$ )		Number of Times Bypassing Official Channels ( $R^2 = .27$ )		Number of Times Provided Own Resources ( $R^2 = .24$ )	
Intrapreneurial self-efficacy	—		.23	***	.39	***	.26	***
Strategic autonomy	.14	*	.12	†	.11	†	.19	*
Front-end formality	.18	*	-.07		-.25	**	-.17	*
Rewards	.04		.14	**	.26	***	.27	***
Sanctions	-.07		-.03		-.06		-.15	*

†  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

projects ( $\beta = .12$ ;  $p = .10$ ), the number of times official channels have been bypassed ( $\beta = .11$ ;  $p = .05$ ), and the number of times employees have provided their own resources ( $\beta = .19$ ;  $p = .01$ ). The effects of *front-end formality* on the number of times official channels have been bypassed ( $\beta = -.25$ ;  $p = .004$ ), and the number of times employees have provided their own resources ( $\beta = -.17$ ;  $p = .025$ ) are significant but in the opposite direction. The relationship to the number of bootlegged projects is insignificant ( $\beta = -.07$ ;  $p = .15$ ). Thus, the results do not support H2. *Rewards* has the expected positive and significant effects on the number of bootlegged projects ( $\beta = .14$ ;  $p = .013$ ), number of times official channels have been bypassed ( $\beta = .26$ ;  $p < .001$ ), and the number of times employees have provided their own resources ( $\beta = .27$ ;  $p < .001$ ), thus supporting H3. Contrary to expectations, *sanctions* has no impact on the number of bootlegged projects ( $\beta = -.03$ ;  $p = .28$ )

or on the number of times that official channels have been bypassed ( $\beta = -.06$ ;  $p = .15$ ) and even a negative effect on the number of times that employees have provided own resources ( $\beta = -.15$ ;  $p = .013$ ). Thus, H4 is not supported by the data. The proposed positive impact of *intrapreneurial self-efficacy* of H5 is evident for the number of bootlegged projects ( $\beta = .23$ ;  $p < .001$ ), the number of times that official channels have been bypassed ( $\beta = .39$ ;  $p < .001$ ), and the number of times that employees have provided their own resources ( $\beta = .26$ ;  $p < .001$ ).

In sum, the formal management practices and self-efficacy explain variance in the three investigated bootlegging behaviors: the number of bootlegged projects ( $R^2 = .10$ , Adj.  $R^2 = .06$ ), the number of times that official channels have been bypassed ( $R^2 = .27$ , Adj.  $R^2 = .24$ ), and the number of times that employees have provided their own resources ( $R^2 = .24$ , Adj.  $R^2 = .20$ ).

**Figure 1. Model and Significant Path Coefficients**

*Mediation Analysis*

To test H6a and H6b, we investigated the indirect effect of formal management practices on bootlegging behaviors through intrapreneurial self-efficacy. In the context of structural equation modeling, the research recommends a product-of-coefficient approach because it better fits in settings in which direct and indirect effects are simultaneously estimated, models incorporate more than three constructs, and multiple-item scales are used (Iacobucci, Saldanha, and Deng, 2007; Shrout and Bolger, 2002). Table 3 reports one column for each step of testing the mediation effect. Based on the results of the main model parameter estimations, both the independent variable–mediator relationship (column 1) and the mediator–dependent variable relationship (column 2) must be significant. For the two organizational consequences, a mediation effect is not possible because of the insignificant relationship of rewards ( $\beta = .04$ ;  $p = .29$ ) and sanctions ( $\beta = -.07$ ;  $p = .15$ ) to the mediator. Strategic autonomy ( $\beta = .14$ ;  $p = .04$ ) and front-end formality ( $\beta = .18$ ;  $p = .05$ ) meet that condition and explain 7% of the variance in intrapreneurial self-efficacy ( $R^2 = .07$ , Adj.  $R^2 = .03$ ). Because all effects of strategic autonomy and front-end formality on the three bootlegging behaviors are significant (column 2), the effects of these formal management factors qualify as being mediated through intrapreneurial self-efficacy. The statistical significance of the indirect effect was assessed using Sobel’s  $z$ -test. Column 3 shows that the indirect effects are also signifi-

cant. To investigate whether the mediations were full or partial, we calculated the significance of the relations between the two remaining formal management practices and all bootlegging behaviors, as reported in column 4. The insignificant relationship between front-end formality and the number of bootlegged projects indicates full mediation. Thus, although formality does not directly impact bootlegging intensity, it increases it by fostering self-efficacy (indirect effect of .04). The remaining paths between independent and dependent variables are significant, which suggests partial mediation. The variance accounted for (VAF) informed the percentage of the independent variable’s effect exerted through the mediator. For strategic autonomy, the proportion of the total positive effect conveyed through self-efficacy is 21.3% for the number of bootlegged projects, 32.8% for the number of times bypassing official channels, and 16.6% for the number of times that employees have provided their own resources (see column VAF). For front-end formality’s impact on employees’ bypassing and providing their own resources, a suppression effect is identified. Whereas the direct effects are both significantly negative, the indirect paths through the mediator are all significantly positive. Thus, the negative effects of front-end formality are weakened by the positive side effect of an increase in self-efficacy, but total effects still remain negative on the number of times that employees bypass official channels (total effect of  $-.19$ ) and the number of times that employees provide their own resources (total effect of  $-.12$ ). VAF is not calculated because it is outside the

**Table 3. Results of Mediation Analysis**

Independent Variable (IV)	Mediator (ME)	Dependent Variable (DV)	1 <i>p</i>	2 <i>p</i>	3 <i>p</i>	4 <i>p</i>	VAF	Mediation
Strategic autonomy	Intrapreneurial self-efficacy	Number of bootlegged projects	<b>.042</b>	<b>.000</b>	<b>.057</b>	<b>.099</b>	21.30%	<b>Partial</b>
Front-end formality			<b>.046</b>	<b>.000</b>	<b>.060</b>	.151	100% <sup>a</sup>	<b>Total</b>
Rewards			.286					No
Sanctions			.149					No
Strategic autonomy	Intrapreneurial self-efficacy	Number of times bypassing official channels	<b>.042</b>	<b>.000</b>	<b>.050</b>	<b>.053</b>	32.80%	<b>Partial</b>
Front-end formality			<b>.046</b>	<b>.000</b>	<b>.100</b>	<b>.004</b>	— <sup>b</sup>	<b>Partial</b>
Rewards			.286					No
Sanctions			.149					No
Strategic autonomy	Intrapreneurial self-efficacy	Number of times providing own resources	<b>.042</b>	<b>.001</b>	<b>.066</b>	<b>.012</b>	16.60%	<b>Partial</b>
Front-end formality			<b>.046</b>	<b>.001</b>	<b>.026</b>	<b>.025</b>	— <sup>b</sup>	<b>Partial</b>
Rewards			.286					No
Sanctions			.149					No

Column 1: Independent variable—mediator; column 2: mediator—dependent variable; column 3: Sobel-test based on one-tailed  $t$ -test because of hypothesized directions of all paths; column 4: independent variable—dependent variable.

*p*, level of significance. Significant *p*-values are in bold.

<sup>a</sup> VAF set to 100% because IV–DV is not significant, whereas IV–ME and ME–DV are significant.

<sup>b</sup> VAF is not calculated because of the suppression effect and a VAF value outside the meaningful range. VAF, variance accounted for.

meaningful range due to the suppression effect. In summary, H6a is partially supported, and H6b is rejected.

## Discussion and Theoretical Contributions

The primary contribution of this research to the literature is the demonstration that formal management practices, which prior literature identifies as important for managing employees' compliant innovation activities, have a significant impact on employees' bootlegging activities. More specifically, our findings support the assumption that strategic autonomy stimulates employees to elaborate their ideas "in the underground," provide their own resources for idea elaboration, and promote their ideas offside official communication channels. Furthermore, we show that if an organization provides rewards for innovative accomplishments, bootlegging behavior is more likely. These organizational factors have also been identified by prior literature about compliant employee entrepreneurship behavior and creativity (e.g., Amabile, 1996; Hornsby et al., 2002; Marvel et al., 2007), which can now be extended to deviant bootlegging behavior.

In turn, we find that the total effect of front-end formality on the specific bootlegging behaviors of employees bypassing official channels and providing their own resources is negative. These unexpected results suggest that formal process structures offer employees a place to go to communicate their ideas, which makes the corresponding deviant behavior obsolete. An alternative explanation could be that higher formality makes it more difficult for employees to find a receptive institution for bootleg ideas that tolerates bypassing official channels (Criscuolo et al., 2013). One reason for the negative impact on employees providing their own resources to develop their ideas may be that formal process structures provide sufficient slack resources for elaboration activities, making it unnecessary to gather further organizational resources illegally. Another explanation may be that front-end formalization simply makes it more difficult for employees to access the necessary resources for their elaboration activities because they are assigned to official projects and monitored. However, this does not necessarily imply that formal processes prevent bootlegging behavior. Although the direct relationship between front-end formality and the number of bootlegged projects is insignificant, the mediation analysis reveals that front-end formality increases intrapreneurial self-efficacy, which in turn has a positive impact on the number of bootlegged projects. Thus, formal guidelines support the development of employees' self-beliefs in their own abilities by supplying a proven course of action

for front-end activities. This finding extends the current literature on employees' entrepreneurship behavior, which proposes that formal control mechanisms are needed to systematically guide and select employees' initiatives to foster organizational performance (Goodale et al., 2011).

With respect to sanctions, we find that employees provide fewer resources of their own when negative consequences are expected from innovation failure. One reason may be that potential sanctions motivate employees to reduce risk associated with deviant activities by limiting their personal resource investments, which is in line with the findings of March and Shapira (1987). Furthermore, sanctions do not affect employees' efforts to bypass official channels to pursue their ideas, a result that does not support the prior finding of Dutton et al. (1997) that potential sanctions inhibit issue-selling activities. An explanation for this may be that bypassing official channels is motivated by the desire to gain support and feedback for ideas from those who are open to new ideas—not by the desire to find sponsors and protectors to reduce risk in case of failure. Therefore, potential sanctions do not inhibit bypassing because the addressed audience is unlikely either to make failures visible or to sanction them.

Sanctions also do not affect employees' bootlegging intensity. It appears that the main motive behind bootlegging is to protect ideas from early rejection due to either limited supportive data about its feasibility or its strategic misfit (Koch and Leitner, 2008) and not to protect the initiator from potential sanctions. To investigate possible interactions between rewards and sanctions, we performed an additional analysis by integrating a product term into the main model. Although this interaction term is insignificant for the number of times that employees bypass official channels and provide their own resources, it is significantly negative for the number of bootlegged projects ( $\beta = -.39$ ;  $p = .007$ ) and increases the explained variance by 5%. Thus, the positive effects of rewards on bypassing official channels and employees' provision of their own resources are not disrupted by sanctions for failure. However, although rewards may stimulate bootlegging, an increase in sanctions weakens the positive effect of rewards. The emergence of bootlegging is most likely in organizations that provide both rewards and failure tolerance. Sanctions and their interactions with rewards are barely addressed in the literature (Hayton, 2005; Marvel et al., 2007). This research extends current knowledge with its finding that sanctions do not inhibit all deviant entrepreneurship activities, but they disrupt the motivating effect of rewards for bootlegging.

Together with prior research on compliant and constructive deviant innovative behavior (e.g., Axtell et al., 2000; Morrison and Phelps, 1999; Speier and Frese, 1997), our empirical findings support a strong and general relationship between employees' self-beliefs related to innovative tasks and innovative behaviors. Furthermore, organizations support employees to develop a stronger sense of control over initiative-related activities by providing strategic autonomy and front-end formality. Contrary to expectations, rewards and sanctions have no effect on employees' self-beliefs. One explanation for this might be that rewards and sanctions do not indicate the appropriateness of the individual capabilities necessary to succeed in intrapreneurial tasks. This may be the case if an employee perceives organizational rewards and sanctions as dependent on factors other than personal ability, such as personal networks, an idea's fit to current trends and organizational issues, or simple fate.

Our results show that social cognitive theory is a valuable framework for the literature on employees' entrepreneurship behavior, which is often criticized for its lack of theory (Hayton, 2005). Social cognitive theory (Bandura, 1986) proposes that employees begin bootlegging activities if they believe themselves to have the necessary abilities for intrapreneurial tasks and that both self-efficacy and the motivation for bootlegging are influenced by the degree to which an organization enables its employees to engage in innovation activities. With respect to strain theory (Merton, 1968) and creative deviance theory (Mainemelis, 2010), our results support that strategic autonomy is an essential precondition for bootlegging and that encouraging innovation through rewards facilitates this deviance. Creative deviance theory also proposes that structures that systematically open up legitimate means for idea elaboration while simultaneously limiting the available resources to fund only a subset of ideas, stimulate bootlegging. However, our findings do not support this positive effect of front-end formality on bootlegging. Thus, these theories provide only partial explanations for the emergence of individual bootlegging, which may be caused by their organizational-level focus on deviance.

### Limitations and Future Research

Empirically, we gathered employees' explicit perception of their work environment partially by using new scales. This method did not fully ensure that the gathered perceptions fully reflected corporate reality. Furthermore, we used self-reported and single-source data. This approach is appropriate because bootlegging behaviors

are not comprehensively observable by others, and the constructs require self-rating to reflect employees' beliefs and perceptions. Future research could use different measurement scales for the investigated factors to test whether our results can be replicated. Alternatively, it could assess the frequency of successful, and therefore visible, bootlegging initiatives by inquiring of supervisors, but would be required to be mindful of observational and impression biases. Furthermore, this research focuses on the general frequency of bootlegging behaviors but does not investigate in detail the projects' characteristics. We expect substantial differences in behavioral choice depending on a project's degree of innovativeness, strategic alignment, and whether it was generated from an internal or external source. Our results also suggest that measures regarding incentives must be precise. We focused on outcome-based rewards, but further research may investigate in greater detail the distinctive effects of process versus outcome-based compensation. This is also the case for sanctions. With respect to the unexpected finding that formality results in employees providing less of their own resources for bootlegging, future research may investigate whether this is a result of the tighter resource control or the availability of sufficient dedicated resources for idea elaboration. Another valuable extension of this research may be the investigation of management practices aimed at communicating an organization's innovation goals. Strain theory proposes that the emergence of deviance depends on the internalization of a social system's goals by its members. Therefore, factors such as innovation campaigns and managers' encouragement of employees to innovate may explain additional variance in bootlegging intensity (Mainemelis, 2010). Finally, structural equation modeling is limited to analyzing whether direct relationships between constructs are supported by empirical data; it is not capable of confirming causality. Such inferences need different research designs such as experiments or longitudinal studies.

### Managerial Implications

This study shows that bootlegging behavior does not occur randomly; instead, it can be influenced by designing the organizational environment around employees' cognition and motivation. Managers with a positive attitude toward bootlegging may stimulate this deviance by granting work autonomy so that employees have the self-efficacy, freedom, and resource access to elaborate new ideas "in the underground." Furthermore, managers can facilitate bootlegging by providing rewards for

innovation accomplishments and failure tolerance. Rewards signal that the organization favors innovation and even strengthens the desirability of achieving this goal, even if this requires illegitimate means.

If management has a negative attitude toward creative deviance, recommendations on how to prevent bootlegging must ensure that such measures should not harm employees' innovative behavior in general. While limiting employees' autonomy and close monitoring of their behavior are options for preventing bootlegging, prior research suggests that this restriction may impede all innovative behaviors (e.g., Amabile, 1996; Axtell et al., 2000).

Eliminating outcome-based rewards for innovation accomplishments is also an improper way to stop employees from bootlegging because it may harm compliant innovative behavior. If failure sanctions are simultaneously imposed, fewer bootlegged projects emerge. However, failure tolerance fosters compliant innovative behaviors, and sanctions have a negative impact on all innovative efforts by employees. Thus, organizations need to find other ways to inhibit the anarchy caused by excessive bootlegging. One strategy, as suggested by Mainemelis (2010), is to reward successful bootlegging activities but downplay the role of their deviant components when communicating bootlegging-related achievements. Other employees may be aware of the illegitimate means that created the success, but by informally tolerating and downplaying those means, an organization can ensure that some uncertainty remains for other employees about the possible consequences of future bootlegging behavior.

The organizational design of formal guidelines, standards, and their enforcement are more appropriate control mechanisms. Front-end formality only reduces employees' bypassing of official communication channels and provision of their own resources. Thus, formality can be used as a practice: (1) to reduce the risk of employees neglecting the chain of reporting by providing ideas with a clear "place to go" or (2) to prohibit excessive illegal resource application for bootlegging activities by either providing slack resources at the front-end or tight control of the appropriate use of the resources assigned to official projects. When setting up a formal process, organizations must ensure that the reason for the disappearance of deviant efforts is that they are no longer necessary due to a clear recipient for ideas and sufficient resources for their elaboration. Otherwise, these behaviors may disappear due to strong norm enforcement and bureaucracy, which will inhibit all innovation efforts, not only those that are illegitimate.

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## Appendix A. Mean, Standard Deviations, and Correlation Matrix<sup>a</sup>

Construct	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.
1. Strategic autonomy	2.72	.87	(.74)						
2. Front-end formality	3.42	1.12	-.07	(.89)					
3. Rewards	2.60	1.17	.10	.22*	(.80)				
4. Sanctions	2.21	.89	-.11	-.11	-.02	(.87)			
5. Intrapreneurial self-efficacy	3.88	.61	.13	.19 <sup>†</sup>	.07	-.09	(.90)		
6. Number of bootlegged projects	1.58	2.14	.34**	.09	.07	.06	.23*	(—)	
7. Number of times bypassing official channels	1.29	2.35	.23*	-.11	.23*	-.10	.39**	.36**	(—)
8. Number of times providing own resources	3.29	3.92	.38**	-.01	.25*	-.17	.27*	.48**	.67**
9. Domain familiarity	3.60	1.02	.13	.07	-.10	-.13	.50**	.10	.26*
10. Outcome history	3.84	.68	-.05	.13	.02	-.11	.34**	.09	.19 <sup>†</sup>
11. Age	39.21	7.89	.02	-.12	.04	-.08	-.01	.08	.19 <sup>†</sup>
12. Educational level	—	—	.00	.15	.08	-.14	.20 <sup>†</sup>	-.11	.09
13. Organization tenure	9.23	8.40	.09	-.08	-.12	-.18	-.09	.19 <sup>†</sup>	.10
14. Job position	—	—	.13	.05	.01	-.26*	.12	.11	-.10
Construct	Mean	S.D.	8.	9.	10.	11.	12.	13.	14.
8. Number of times providing own resources	3.29	3.92	(—)						
9. Domain familiarity	3.60	1.02	.28**	(.91)					
10. Outcome history	3.84	.68	.36**	.27*	(.78)				
11. Age	39.21	7.89	.08	-.10	-.09	(—)			
12. Educational level	—	—	-.02	.25*	.10	-.10	(—)		
13. Organization tenure	9.23	8.40	.10	-.10	.03	.57**	-.35**	(—)	
14. Job position	—	—	.04	.00	-.01	.41**	.03	.25*	(—)

<sup>†</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ .

<sup>a</sup> S.D., standard deviation. Composite reliability reported along the diagonal.



## Appendix B. Reflective Measurement Model and Indicators<sup>a</sup>

Construct/Indicators	PLS—Outer Model			Sources
	$\lambda$	<i>t</i>	AVE	
<b>Strategic autonomy (c.r. = .74)</b>			.51	Conceptually following Mintzberg and McHugh (1985); Burgelman (1991); Augsdorfer (1996)
I can independently decide to build knowledge by recruiting new employees or forming partnerships with external actors.	.77	4.28		
I can initiate new projects without informing top management at the beginning.	.87	7.58		
I should not develop and pursue new ideas outside my company’s current strategic scope (R).	.41	2.15		
<b>Front-end formality (c.r. = .89)</b>			.68	Based on Cardinal (2001)
There are standard procedures for individual tasks in the early innovation process.	.89	6.21		
Written rules about how to initialize innovation projects exist.	.88	6.22		
There is a formal place to go within the company (people, departments), to which we should refer when we have ideas for innovations.	.76	5.21		
There is strict enforcement of written rules and procedures in the early phase of the innovation process.	.75	5.28		
<b>Rewards (c.r. = .80)</b>			.67	Based on Cardinal (2001); Griffin (1997); Feldman (1996)
Employees receive financial rewards for good innovation ideas and accomplishments (e.g., bonuses, options).	.97	27.47		
Employees receive non-financial rewards for good innovation ideas and accomplishments (e.g., awards, promotion, compensatory time off).	.64	3.91		
<b>Sanctions (c.r. = .88)</b>			.78	Conceptually following Baer and Frese (2003); Kahn (1990); Dutton et al. (1997)
Failure is accompanied by informal negative consequences for the relevant employee (e.g., losing face, peers quickly learning of the failure).	.94	18.08		
Failure is accompanied by formal negative consequences for the relevant employee (e.g., restrictions in discretion, degradation, threatening of job security).	.83	8.64		
<b>Intrapreneurial self-efficacy (c.r. = .90)</b>			.51	Based on Chen et al. (1998); Zhao et al. (2005); Conceptually following Dutton et al. (2001)
Confidence in . . . generating new ideas	.76	16.58		
Developing new products and services	.56	7.24		
Taking the initiative to realize new products/services	.72	10.51		
Resisting new ideas despite considerable internal opposition	.73	18.17		
Introducing new methods of production, marketing, and management	.65	8.39		
Calling top management’s attention to new opportunities	.73	11.39		
Convincing top management of the feasibility of a venture	.77	10.90		
Obtaining support of others for a venture	.76	13.11		
Strategic planning	.56	5.66		
Taking on responsibility for ideas and decisions	.60	7.36		
<b>Bootlegging behaviors</b>				Based on Hornsby et al. (1999)
Number of innovations you started without official organizational approval within the previous 12 months				
Number of times you bypassed official channels to pursue ideas within the previous 12 months				
Number of times you provided your own resources for activities to pursue the development of ideas				

<sup>a</sup>  $\lambda$ , factor loading.  
AVE, average variance extracted; c.r., composite reliability; R, reverse-coded item; *t*, t-value.