

# Frontline Innovation in Times of Crisis

## Learning from the Corona Virus Pandemic

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# Frontline Innovation in Times of Crisis: Learning from the Corona Virus Pandemic

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## **Frontline Innovation in Times of Crisis: Learning from the Corona Virus Pandemic**

### ***Abstract***

The current COVID-19 pandemic brings about dramatic challenges for frontline police officers and their organizations. This will, we argue, likely have two implications for frontline learning and innovation. First, the pandemic will surely occasion a surge of frontline improvisation and innovation in police organizations responding to the crisis as the experienced needs for new solutions dramatically increase. Secondly, but equally importantly, this wave of frontline innovation is likely to be more transparent than is typically the case for innovations developed in frontline police work, because of changes in formal mandates and informal tolerance for procedural deviance. At this moment of unusually widespread and transparent frontline innovation, we propose an approach to capturing and diffusing this frontline innovation. By taking seriously the unique dynamics of frontline innovation, such an approach is likely to capture valuable innovations that might otherwise rapidly dissipate and be lost.

### ***1. Introduction***

There can be no doubt that the current Corona Virus Pandemic dramatically challenges the frontline organizations responding to it. This includes police organizations. Police organizations play key roles in enforcing lockdowns and educating citizens on a massive and unplanned-for scale, while avoiding that criminals exploit the current state of affairs. In doing so, many will be dealing with a number of shortages. Conventional structures and procedures for carrying out police work will frequently be unviable due to requirements to minimize contact and uphold social distance, protective equipment may be insufficient, etc. Nonetheless, police officers are likely to be exposed to infection and subsequently forced to quarantine, thus reducing the number of officers available to execute these new tasks. All of this profoundly upsets established routines.

How organizations respond to, and are impacted by, crises are complex phenomena and anticipating the consequences of the Corona Virus Pandemic is likely to be difficult. It is, however, relatively clear how this particular crisis will impact frontline innovation. Frontline innovation is typically motivated by personal need (von Hippel, 2005) and typically arises as a response to non-canonical problems faced by frontline workers (Brown & Duguid, 1991). Frontline innovation is also frequently hidden (Hartmann & Hartmann, 2020) as a result of frontline innovators interpreting their innovations as exceeding their formal mandates to adopt and adapt new solutions. When immediate managers are perceived as focused on control and adherence to procedure, hiding tends to be ‘deeper’. In a crisis situation like the present, the occurrence of non-canonical problems experienced in the frontline increases dramatically as does the perceived necessity of responding to these problems. Also, the perceived mandate to innovate and managers’ informal tolerance for frontline innovation will typically expand dramatically. As a consequence, we can expect to see both a surge of frontline innovation and much increased transparency around these innovations during the crisis.

There is a very real risk that these innovations – and therefore the learning that they embody – will not be effectively institutionalized by existing approaches to knowledge management and ‘lessons learned’ once the crisis subsides and police organizations return to bureaucratic normality. At this moment of unusually widespread and unusually transparent frontline innovation, this paper proposes an alternative approach to capturing these learnings, focused on ‘lead user identification’ and ‘horizontal’ diffusion, and presents practical guideposts for applying this approach in the police context, as well as important caveats to its efficacy. Our purpose is to reduce the risk that valuable learning dissipates and fails to impact future preparedness, leaving police organizations underprepared and wider society at risk.

Two issues deserve mention already at the outset. We do *not* mean to imply that frontline innovation is the only form of innovation that this crisis will accelerate. Innovation will obviously happen at virtually all levels of the police organizations. Much of the strategic learning is, however, quite likely to be captured by commonly used ‘lessons learned’ systems. That is, we fear, not the case for frontline innovation and hence this call to consider alternative approaches to learning from the current crisis, lest learning opportunities are missed. Moreover, while several of our arguments rely on evidence drawn from military organizations, we do not mean to imply that police and military are culturally or

organizationally equivalent. There are similarities, differences, and trends towards both convergence and differentiation between these types of organization, and within each there is considerable variation (Chan, 1996; Holgersson et al, 2008; Rahr & Rice, 2015; Rivera, 2015; Coyne & Hall, 2018). It is also clear that there are both similarities and differences in the nature of the frontline innovation process between the two (Hartmann & Hartmann, 2020). Our suggestion is not that the military experience of post-crisis learning will mirror the police equivalent, or vice versa, but to take the shortcomings of common military approaches as a point of caution for police efforts. It is in that spirit that we proceed.

## ***2. Frontline innovation and the impact of crisis***

To capture the learning that occurs in the organizational frontline, it is key to appreciate the nature of frontline innovation because it represents a particular ‘mode’ of learning and innovating (Jensen et al, 2007; O’Toole & Talbot, 2011). This has implications for how it will be impacted by crisis and for how police organizations might (fail to) benefit from it.

Innovation, as it relates to frontline work, refers to solutions that are either functionally novel (i.e. allow for new things to be done) or significant improvements in the performance of existing solutions (Hartmann & Hartmann, 2020). As such, the presence of discretion contributes to the processes through which frontline innovations are developed and used, and frontline innovation is deeply integral to frontline work. (Brown & Duguid, 1991; Hartmann, 2014), but also more durable and more significant than the kind of everyday variation in practices that arise from police officers’ “enormous discretion” (Chan, 1996: 110; Lipsky, 1969).

Consider, firstly, why police officers might engage in this kind of frontline innovation. When frontline police officers innovate, they typically do so to solve ‘non-canonical’ problems that they themselves experience (Hartmann & Hartmann, 2020). Non-canonical problems are those problems that are *not* well-captured in formal organizational descriptions of how work is carried out (Brown & Duguid, 1991). They are the problems that emerge in the course of everyday work as workers encounter conditions ‘on the ground’ that are complex, situated and emergent. The knowledge of these problems is often tacit (Polanyi, 1966), deeply embedded in ‘street-knowledge’ (Holgersson et al, 2008), and therefore difficult, costly and time-consuming to transfer (Von Hippel, 1994) to individuals not

engaged in the particular practices of frontline officers (Brown & Duguid, 2001). When police officers experience non-canonical problems, they often do so personally and directly as they engage in their professional practices. This means that the primary incentive for innovating to overcome non-canonical problems will therefore typically be to benefit from *using* the solution themselves (von Hippel, 2005). Precisely because of the very situated and ‘sticky’ nature of the problems addressed, it is also difficult for people to solve them, if they do not have first-hand experience of them.

This should imply that frontline innovation increases during times of crisis. A crisis like the present implies that new tasks emerge, established procedures fall short and new material requirement arise. The resources that officers usually rely on to solve their tasks may cease to be effective and the resources required for new tasks may simply not exist. The formal organization, including administrative units, may also struggle to provide generally applicable solutions to problems experienced ‘on the ground’. Moreover, the urgency of solving problems may increase, because the stakes of ‘doing nothing’ are high. Theoretically, this means that non-canonical problems proliferate and that the expected benefit of developing solutions increases. That ought to occasion increased frontline innovation. Whether this is the case in police organizations is uncertain, but we know what happens when military units and soldiers are deployed to conflict zones, which constitutes a ‘shock’ akin to what a domestic crisis does to police forces (e.g. Kollars, 2014, 2015; Foley et al, 2011; Foley, 2012; Marcus, 2015): established ways of working may not fit rapidly evolving battlefield conditions. Soldiers are therefore strongly incentivized to devise safer and more effective procedures which they develop themselves and are, like other frontline workers, uniquely positioned to identify both problems and viable solutions (Tucker et al, 2002).

Consider, secondly, the transparency of these innovation efforts. When police officers innovate, they frequently hide their innovations (Hartmann & Hartmann, 2020). Such innovation hiding is a common feature of frontline innovations across many bureaucratic organizations, such military organizations (e.g. Lindsay, 2010), healthcare settings (e.g. Gomez-Marquez & Young, 2016) and different forms of highly standardized industrial production (e.g. Bernstein, 2012; Thomas, 1994; Halle, 1984). In part, hiding is a consequence of the bureaucratic setting, because efficiency is dependent on standardization and uniformity, not idiosyncratic ad hoc solutions (Abernathy, 1976; March, 1991). Crucially, however, it is dependent on how workers interpret the conditions for implementing

innovations that they develop autonomously in their particular setting. When the development on an innovation exceeds their perceived formal mandate to innovate, they tend to hide that innovation because hiding is a precondition for benefiting from using that innovation directly. When managers are further interpreted as oriented towards control rather than learning – control being the canonical task of bureaucratic managers (Weber, 1922/1978) and a rightfully common preoccupation of ‘management cops’ (Holgersson et al, 2008; Reuss-Ianni, 2011) – workers engage in ‘deeper’ and more effortful forms of hiding, going to greater lengths to keep their innovations safely hidden from managers that might punish their development and use.

In times of crisis, hiding is likely to be much less prevalent than is usually the case. Frontline innovators may well interpret their formal mandates to innovate as expanded. Organizations may explicitly devolve authority to the frontlines, empowering on-the-ground adaptation and solution-finding, or innovators may interpret their organizations’ response to the crisis as implicitly expanding their mandate. This may prompt innovations developed in the frontline to be used openly, rather than to be hidden as might be case under non-crisis circumstances. Moreover, to the extent that formal mandates are perceived as unchanged, frontline innovators may interpret their immediate managers as more informally tolerant of innovation than is usually the case as their orientation shifts from control (ensuring adherence to procedure) to learning (coping, sometimes desperately, with emergent, non-canonical problems). This may prompt innovations to be less ‘deeply’ hidden that would be the case under non-crisis circumstances (Hartmann & Hartmann, 2020). Desperate times, innovators may reason, allow for transparent use of their innovation.

### ***3. Dissemination of frontline innovation during and after crises***

While learning and innovation happens extensively in the frontline, it is difficult to know how widely innovations developed during the crisis will be diffused during the crisis itself. It is easy to imagine that the present crisis reduces the resources that innovators might invest in actively diffusing their innovations. Crisis conditions may be such that there are simply less resources available to communicate ideas across communities, and the conventional ways that innovations spread may be interrupted (e.g. Orr, 1996). This is likely to exacerbate the problem of under-diffusion common to innovations developed by individuals primarily

motivated by solving their own immediate problems (e.g. De Jong et al, 2015; Von Hippel et al, 2017). However, pro-social incentives to diffuse innovations may increase, leading to greater diffusion effort on the part of innovators. Also, incentives to search for and adopt innovations (for non-innovators) may increase, implying that lower effort needs to be invested (by innovators) to share innovations, because local units and professional peers actively seek out solutions to adopt to solve the problems that they urgently face. There is evidence of wartime military frontline innovation diffusing well ‘in theatre’, even as they only slowly impact doctrine ‘at home’ (e.g. Kollars, 2014; Foley, 2012). This is consistent both with observations of resistance to innovation generally (e.g. Morison, 1967) and with theories of knowledge transfer across communities of practice (e.g. Brown & Duguid, 2001). It is, however, unclear which effects will dominate the ongoing situation in the specific police organization since that depends on a complex interplay of individual (e.g. Schön, 1983) and organizational (e.g. Senge, 1992) factors and how they enable or disable such learning.

What will happen in the aftermath of the crisis can more readily be inferred: once police organizations return to bureaucratic normality, many of the innovations developed in the organizational frontline will not be institutionalized and much of the underlying learning is likely to rapidly dissipate. With a return to normality, attention will (for good reasons) revert to standardized procedures and on-going efficiency improvement. The urgent need for finding solutions will dramatically decrease, meaning that greater diffusion efforts will be required by innovators to have innovations institutionalized (e.g. Lindsay, 2010). Those same innovators, recognizing that their formal mandates and managerial tolerances have also returned to bureaucratic normality, may return to actively hiding innovations for fear of sanctions (e.g. Hartmann & Hartmann, 2020) and peers may be less reluctant to ‘rat’ on particularly innovative individuals (Chan, 1996). Without being used, the practical communal knowledge that occasioned frontline innovation may cease to be mobilized occasioning organizational forgetting, just as the professional communities in which frontline innovation occurred may dissipate as community members move to new organizational functions and corresponding new tasks (e.g. Kollars, 2014).

Recognizing that institutionalization does not just happen, many police organizations may adopt some form of ‘lessons learned’ system. In police, innovation tends to be equated with organizational and strategic conceptual change, not with the kind of innovation that occurs in the organizational frontline (Weisburd & Braga, 2019; Hartmann, 2014). As such,



the spontaneous reaction would be to focus on the innovation, adaptation and learning that occurred at relatively high organizational levels. However, it may well be clear to employees at all levels that innovation in this crisis will be occurring throughout the organization, and that may occasion effort to also engage with innovation more broadly.

The literature on how *military* organizations typically approach collecting such lessons-learned processes offers several cautionary tales for *police* organizations that might adopt them in some form. In the military experience, when such systems and processes are designed, emphasis will likely be on collecting ideas from across the organization, selecting the most impactful ones and transmitting them *upwards*, through the chain of command, to the organizational apex. The collection of the ideas also tends to be done primarily by managers. This seemingly obvious choice has some fairly predictable implications, borne out quite clearly in experience of using those systems in military contexts. Lessons tend, in military practice, to be collected at relatively high organizations levels (e.g. at the brigade level and upwards) and far from the operational frontline (Marcus, 2015; Foley et al, 2015), reflecting a general tendency to see important innovation as originating at the upper echelons of organizations (e.g. Grissom, 2006). This invariably prioritizes key strategic learnings over workers' on-the-ground experience and the myriad solutions large and small that they might have developed. It creates a problem for those at higher organizational levels of integrating local solutions that frontline innovators develop into comprehensive wholes, which easily omits local knowledge and circumstance. It also limits workers' ability and quite possibly their willingness to contribute lessons learned directly, because it implies having innovations evaluated by people who do not partake in innovators' professional communities and consequently may not be trusted to recognize the significance of particular innovations (Hartmann, 2014). The 'propose-dispose' model (Schön, 1967) implicit in this approach, where workers propose ideas for managers to promote or dispose of, may be thoroughly unappealing for workers to partake in (Hartmann & Hartmann, 2020).

This is not to say that such systems are not important and that the kinds of learnings they capture do not matter. That would clearly be absurd. It is also not to say that the problems they are meant to solve are easy. Knowledge management in general is, for a range of good reasons, very difficult (e.g. Alavi & Leidner, 2001) and especially so in police organizations characterized by strong epistemic differences (Holgersson et al, 2008). It is, however, likely that they are structurally ill-suited for identifying and disseminating *frontline*

*innovation*, even as it is hard to gauge just *how* ill-suited. This difficulty arises from two ('sampling') issues. For one, the *share* of innovations captured by these systems cannot be ascertained. Innovators can choose to hide their innovations, leaving the true number of innovations available for sharing shrouded in uncertainty and making the extent of underreporting difficult to assess. Second, the quality of innovations observed through these systems might say very little about the quality of frontline innovations generally. When frontline innovations tactically decide which innovations to reveal and which to conceal, the sample is likely systematically biased, but we do not know in which way. So far, studies indicate that frontline innovators do *not* openly use the ideas they consider most valuable (Hartmann & Hartmann, 2020), but whether this tendency will extend to the aftermath of the Corona Virus Pandemic is not clear. What seems likely, though, is that conventional lessons learned systems would undervalue frontline innovation, by identifying too few innovations and not identifying those of highest value. Consider the following: If a lessons-learned system only identifies few and insignificant frontline innovations, is that a sign that frontline innovation is rare and trivial, or a sign that the system for collecting them functions poorly? Paradoxically, the tendency of frontline workers to innovate on their own initiative may hide the actual extent of experienced problems at the operating level (Tucker et al, 2002), creating the erroneous appearance that the need for frontline innovation is limited.

#### ***4. Identifying and institutionalizing frontline innovation***

The approach that we suggest borrows from well-understood methods in innovation management, focused on identifying solutions developed by *users* and *user communities* (von Hippel, 2005). In this capacity, it operates on the assumption that learning and innovation is both more *sticky* and more widely *distributed* than assumed in even very decentralized approaches to collecting 'lessons learned' (e.g. Marcus, 2015). It centers on identifying *individuals* likely to innovate based on their intensity of practical experience, rather than formal organizational role and rank, and on diffusing their solutions horizontally (through communities of practice), rather than vertically (up and down the chain of command).

To understand why such a method would be effective, it is central to appreciate that frontline innovations are often the subject of 'war stories'. Such stories are shared within professional communities and are important vehicles for distributing knowledge within the

community (Brown & Duguid, 1991). When workers gather and ‘talk shop’, the stories that are shared are often about situations of adversity and overcoming it (Orr, 1996). Aside from making for good stories, those situations of adversity are also situations that tend to occasion frontline innovation. Overcoming adversity frequently involves learning and creating solutions. As such, frontline innovations find their way into the stories that workers share with each other. Even if innovators make no active efforts to diffuse their innovations themselves, stories about the innovator and of innovations may travel within communities, but not across their boundaries (Brown & Duguid, 2001). Within the community, the problems and solutions that ‘war stories’ centre on may be readily appreciated and readily relayed. Beyond the community’s boundaries, less so.

It is also central to appreciate that frontline innovation, while widely distributed, is concentrated around ‘lead users’ (von Hippel, 1986) who develop more and more valuable innovations than the typical innovator (Urban & von Hippel, 1988). Some frontline workers experience problems before others and are, in this sense, ‘ahead of trends’ due to their organizational location. They are exposed to problems that others will be encountering only months or years later, and their needs thus foreshadow the needs of others. Some frontline workers also experience the need for innovation more strongly than others. They may be exposed to more pressing problems than peers, or they may feel more strongly about the need to solve problems that they encounter, and so the benefits they expect from developing solutions is higher than what peers with less pressing problems experience. These two dimensions – being ahead-of-trend and having high expected benefits – make people both more likely to innovate and more likely to develop innovations of high value (Franke et al, 2006). Alas, lead users are rare by definition.

Despite being rare, lead users with these characteristics of strong needs and ahead-of-trend experience of problems can be more effectively identified through ‘pyramiding’ (von Hippel et al, 2009) than through indiscriminate screenings of large cohorts. Pyramiding search begins with a few people in a population. These people are asked to identify others in the population that have more of a given attribute than themselves. The people thus identified are then asked to identify others with even more of a given attribute, i.e. ‘higher up the pyramid’. By repeating this process a number of times, the person conducting the study will get progressively closer to individuals highest in that attribute (‘the top of the pyramid’). If we were interested in finding the most expert shooters in a police

unit, for example, we might start by asking any given police officer ‘who is the best marksman that you know’. They would know someone better than themselves and refer us to that person. If we ask that person the same question, they would refer us to someone even better and by repeating the process in series we would eventually find the most expert shooter in the unit, and this most expert shooter would likely be able to direct us to even better marksmen beyond the unit. We might start with asking not one person, but several, and that might lead us to either converging on *one* best shooter, or identifying several that were good in different ways (e.g. long range rifle shooting, field shooting with pistols, etc.).

In searching for innovative lead users within organizational settings, pyramiding takes advantage both of the social structure of informal communities of practice and of the nature of the war stories that circulate within such communities. In communities of practice, members know other members with different levels of expertise. Some will be on par with themselves, others will be less expert and some will be more, and the most expert members tend to be respected and known within the community (Lave & Wenger, 1991). As such, many people will be able to direct the person conducting a pyramiding study to individuals closer to the top. ‘War stories’ also circulate within communities and good stories circulate widely. As such, stories of particularly effective and inventive solutions are likely to have been shared and heard by many more individuals than trivial solutions, making it more likely that the protagonists of good war stories will be widely known. Moreover, expertness is a source of pride and experts often play important roles in supporting and teaching newcomers to the community (Lave & Wenger, 1991). As such, experts can be expected to willingly share their expertise with others, provided this sharing can happen in accordance with community norms and that the individual’s expertness is acknowledged (Orr, 1996; Bobrow & Whalen, 2002).

Lead users are, importantly, not to be confused with the champions (Peters & Waterman, 1982; Kotter, 1995) that are often ascribed considerable importance in organizational change. A lead user is not defined by their effects (i.e. the change they help affect) or the derived consequences of those effects (e.g. reputation, power, notoriety, etc.). They are defined precisely by the strength of their needs and the temporality of their exposure to problems. A lead user is also not characterized, as is the case of champions, by having outsize effects on their organizations. They are characterized by their propensity to innovate, and those innovations may or may not have dramatic effects. The image that one should have

in mind when considering lead users, then, is an image of a tinkerer and problem solver, someone ‘fixing’ and inventing and devising new solutions. It is less an image of an outspoken change agent. There may well be overlaps, of course, such that lead users are also cultural champions but this should not be assumed. Looking to cultural champions as potential innovators is unlikely to be as effective a means of identifying innovations as focusing on the two central determinants of lead-userness.

In the context of police organizations, this approach means three things. First, the emphasis should not be on identifying all innovations, and not all police officers will be equally likely to have valuable innovations to offer. Asking everyone to contribute can lead to a deluge of not-quite-good ideas, making identification of the most valuable ones a difficult challenge of sorting signal from noise. Rather, there will be pockets of intense innovative activity within the organization, and the key is to identify those pockets. Second, to identify these pockets, the individuals tasked with finding them (‘searchers’) should not follow formal organizational boundaries, but search through informal networks that traverse the organization and sometimes extend outside of it. Sometimes informal networks may reside within formal organizational boundaries, but this should not be assumed. Confining the search for lead users to a particular, formally defined organizational unit may well prevent the searcher from getting closer to the ‘top of the pyramid’. Third, searchers should not necessarily be police managers. Simply by virtue of being managers specialized in managerial work, police managers may not possess the on-the-ground knowledge that is necessary to appreciate why a particular innovation ‘works’ in a particular professional community. They may also struggle to gain access to the informal networks that professional communities are built on (Brown & Duguid, 1991; Orr, 1996; Hartmann & Hartmann, 2020; Holgersson et al, 2008). Instead, police organizations might consider tasking local trainers and police academy instructors with identifying valuable frontline innovations *within their particular field of expertise*. While this approach is not infallible, trainers and instructors are likely to have a level of expertise and interest that lets them access informal communities. They may even be participants in them already.

Once innovative solutions have been identified, organizations can rely on different means of diffusion (Foley, 2012; see also Von Hippel, 2007). One is vertical diffusion, where innovations are cataloged and communicated upwards in the organization where decision makers can evaluate which to keep, which to discard and which to transfer further up. Then,

they can be transferred back down the hierarchy. The other is horizontal diffusion, where innovations are communicated laterally through communities of practice across the organization. Vertical diffusion is the approach most often used in lessons learned systems, because it affords the organization the opportunity to coordinate the implementation of innovations and ensure uniformity of practice. For the purposes of diffusing frontline innovation, a horizontal approach may be more relevant. It enables innovations to be evaluated primarily by individuals with relevant personal experience. They may have used prior solutions, experienced problems similar to those faced by the innovator, and are likely to use innovations directly. This provides them both with strong incentives to select valuable solutions and the knowledge to do so, taking into account the specific local conditions that they themselves will be using the innovation in and adapting the innovation accordingly.

In the police context, this would imply three things. For one, it means that cataloging innovations, organizing them in central repositories and subjecting them to managerial evaluation is postponed. That process is important, but is better thought of as a way to consecrate practices, not to identify, diffuse and implement them. Second, primacy is given to connecting searchers and lead users across the organization and allowing them time and space to quickly and with a formal mandate do what is otherwise done informally and more serendipitously. This includes meeting, exchanging information about the diversity of solutions to particular problems and experimenting with those solutions and their local relevance. Third, as innovations are thus diffused, the first steps towards institutionalizing them should be to apply them in local training efforts and local practice, to gauge their relevance to non-lead users. Later steps might be to compile and formalize the solutions that are most relevant to broad swathes of the police organization through new standard operating procedures and new equipment. Focus should initially be learning and experimenting, not formalizing, perfecting and coordinating.

This approach is largely an ‘analog’ one, and it bears mentioning that digital ones might also be viable. Digital methods might involve setting up platforms, repositories or ‘suggestion boxes’ and ‘Idea Management Systems’ where innovators can contribute their ideas in what would effectively be a form of intra-organizational ‘crowdsourcing’. This would avoid the effort required to actively find innovations, and can therefore seem compelling. While viable, such approaches are not straightforward and the design— social and technical – is difficult to get right. It must ensure that participation and sharing of innovations

requires very limited effort, it must succeed in attracting lead users to be truly effective, and it will also need to feature mechanisms of gauging the value of ideas that take expert opinion into account (e.g. Bobrow & Whalen, 2002). It speaks to this difficulty that when such platforms do succeed, it is often because they are developed bottom-up, by the lead users who will ultimately benefit from them (Foley et al, 2015; Marcus, 2015) and therefore became a vehicle for informal communities to interact, rather than an extension of the formal organization searching for solutions.

### ***5. Important caveats***

While the approach outlined above – centred on lead user identification and horizontal innovation diffusion – is more likely to be successful than centralized and manager-led initiatives based on vertical diffusion, there are important caveats to its efficacy.

It is necessary to recognize that innovations generally increase *variance*, not averages (March, 1991). While the kind of learning that refines and extends what is already known tends to predictably improve average performance, this is not the case more innovative and ‘explorative’ learning. The outcomes of exploration are, on average, not likely to be better than current practice and may even be worse. However, the outcomes of exploration vary more. Some represent improvement, others the opposite and tolerance of both is necessary for the improvements to occur. For police organizations – and bureaucratic organizations generally – this poses a challenge, because innovation implies compromising standardization and, to some extent, short-term quality. For police organizations in particular, it implies that not citizens are offered the same service. It also implies that some, possibly many, of the innovations that have been developed in the course of responding to the crisis may not be particularly valuable, useful or even well-performing. Frontline solutions are not particularly likely to be decidedly harmful, given that frontline innovators often use the innovations themselves and therefore have ‘skin in the game’ if their innovations do not function, but that does not rule out the possibility of innovations having considerable negative for others or for the organization at large (i.e. negative externalities).

By extension, the efficacy of efforts to identify frontline innovation is likely to depend on innovators being given a ‘green card’ to disclose their innovations without risk of sanction, and that depends in turn on not punishing the development of ideas that turned out



to not function. Frontline innovators have considerable opportunities to hide their innovations and this can render efforts to identify them nigh impossible. Such hiding behaviour is likely if innovators are uncertain about the consequences of disclosure (Hartmann & Hartmann, 2020) and reducing that uncertainty is likely to make innovators much more willing to disclose their innovations. Giving innovators a ‘green card’ and ensuring that they will not be sanctioned for having developed and used innovations *even if those innovations had undesirable consequences* will therefore be a decisive factor in any effort to identify them. Not granting such a clemency *ex ante* is likely to imply that many innovations will not be disclosed, including quite possibly the most valuable ones.

In addition to exhibiting varying value, frontline innovations are also likely to appear rudimentary and imperfect once identified. Most solutions are developed using only knowledge and materials that are readily available, and the aim of the innovator will often be to efficiently create a functioning prototype (Hartmann & Hartmann, 2020; see also Luthje et al, 2005; Hiennerth et al, 2014) because their interest is in solving their own, immediate problems. Many will (metaphorically or literally) be duct-taped together. Many innovators are unlikely to have available the tools, resources and (especially under the present circumstances) time to develop innovations with more polished appearances, and robust and consistent performance. What is important in this regard is to assess innovations for their *functional novelty* (von Hippel, 1988), for what problems they solve, rather than for how well they solve them. It is likely from the functional novelty and the approach to solving the problem at hand that the most substantive learning can be gleaned.

Finally, it is crucial to evaluate frontline innovations in light of their contexts. This includes the particular circumstances in which they are developed and the innovations with which they are interdependent. Frontline innovations tend to be developed to solve problems that the innovator personally experiences. As such, the problems they solve arise in a particular local context and that context may or may not exhibit characteristics that apply widely. An innovation may, for instance, be developed in response to a material shortage that is acutely felt only in a particular part of the organization or address problems that are only experienced in that context. If innovations are evaluated against their *general* usefulness, innovations developed for local needs risk being underappreciated. There can and will be uncertainty about the degree to which local problems foreshadow general problems and therefore the general value of innovation (Rosenberg, 1998). At the same time, innovations



may also be dependent on other innovations or on other contextual factors to be valuable (e.g. Vincenti, 1994). It may be that only users with certain attributes will find a solution valuable or that an innovation only works in used in conjunction with other solutions. Evaluating innovations in a contextual vacuum is therefore also likely to undervalue their usefulness.

## 6. Conclusion

At this moment of unusually widespread and unusually transparent frontline innovation, it is important for police organizations to consider how they might approach leveraging this innovation. We have outlined an understanding of the dynamics of frontline innovation and hiding within it, and against this background offered an approach to institutionalizing innovations that works *with*, rather than against, these largely informal processes. As such, we suggest that (post-)crisis learning focuses on lead user identification and horizontal diffusion. With important caveats, this approach is likely to be more effective than more conventionally employed approaches.

This is not to say that frontline innovation is the only thing that happens during crises, that it is the only thing worth institutionalizing in the wake of a crisis, or that there are not limits to what frontline innovation can achieve. All of these interpretations of our argument would, as we have already alluded to, be wrong. Clearly, learning and innovation happens throughout police organizations during times of crisis. Both strategic and frontline innovation and learning will need to be institutionalized in some manner. Frontline innovators, while subjected to division of labour, are limited in what they can do and the kind of change that they can effect. What is important to appreciate though is that frontline innovation is different from strategic innovation in key respects, contributes valuably to police organizations' adaptability and problem solving during times of crisis, and will need to be handled differently from learnings closer to the strategic apex if police organizations are to benefit from them. The comparatively limited attention that this kind of innovation usually receives in treatments of police innovation (e.g. Weisburd & Braga, 2019) is likely to lead to an underestimation of this important form of innovation and to mismanagement of it.

In and of itself, such underestimation and mismanagement will likely lead to police organizations with a lower preparedness for future crises. Equally troublingly, a failure to appreciate the innovation that is happening and will continue to happen as police

organizations respond to the current crisis may produce a range of undesirable organizational consequences. It may render more stark the divisions between managers and operating police officers (e.g. Brown & Duguid, 1991; Holgersson et al, 2008) and drive more innovation to be hidden in the future (Hartmann & Hartmann, 2020), thus impeding the opportunities for transparency and coordination across the police organization, and contribute to the formation of undesirable subcultures within the police organization (Hartmann, 2014; Micucci & Gomme, 2005). Widespread informal use of non-canonical solutions may also contribute to stark divergences between espoused practices and actual practices, some of which may be socially very undesirable and excessive. These concerns alone should motivate organizations to take very seriously the need for productive engagement with frontline innovators.

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