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EMERGENCE OF IT IMPLEMENTATION CONSEQUENCES IN ORGANIZATIONS: AN ASSEMBLAGE APPROACH[1]

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Ex nihilo nihil fit—nothing comes from nothing—fundamentally challenges IS scholars to explain how a new behavior may emerge and evolve into a recognizable practice from an organization's IT implementation processes. Prior research addressing this problem has ascribed consequences to a preexisting macrolevel structure or microlevel interactions. We examined this issue by conceptualizing the emergence of IT implementation consequences as a multiphased process with analytically disaggregated phases. Using an assemblage lens, our theorizing draws on data from a multisite case study of body-worn camera technology implementation in three municipal police organizations in the U.S. We identified three emergence phases—individuation, composition, and actualization—and developed a process model theorizing a path from material and expressive components to IT implementation consequences through cascading properties and capacities. Our model shows that the emergence of IT implementation consequences is nonlinear and involves feedback loops across multiple phases. In some instances, IT implementation consequences may emerge via negative feedback loops involving tweaks and course correction before converging into recognizable new practices. In other instances, they may fail or convergence into recognizable practices may be delayed. We also show how combining existing components and assemblages results in nesting assemblages at successively larger scales. This allowed us to relativize the micro-macro relationship and explain both top-down and bottom-up emergence of IT implementation consequences.

Keywords: Assemblage theory, assemblage parametrization, assemblage scales, body-worn camera, police, IT implementation consequences, properties, capacities, emergence, nesting, double articulation, individuation, composition, actualization, micro, macro

Introduction

The 2014 killing of Michael Brown, an unarmed Black teenager, by a White police officer in Ferguson, Missouri, triggered violent demonstrations against police organizations in the U.S. Following this incident, police departments across the country accelerated the adoption of body-worn cameras (Harvard Law Review, 2015; Sable-Smith, 2014). Body-worn cameras (BWCs) were touted as a technological solution to cure the ills of police-community relations (President's Task Force, 2015). Yet recent reporting has cast doubt on the efficacy of BWCs, with the provocative title: "How Police Body Cams Have Failed Us" (Umansky, 2023). A confounding issue is that the little academic research on BWCs suggests heterogeneity in its consequences (Lum et al., 2019; Zamoff et al., 2022). For example, while Zamoff et al. (2022) concluded that BWCs significantly reduced civilian complaints against police officers, Yokum et al. (2017) found that they had no effect on citizen complaints against police officers. The heterogeneity in empirical findings has imperiled the "direct applicability prior work has to the decisions confronting many law enforcement agencies" (Zamoff et al., 2022, p. 162). Accordingly, the question of how the consequences of BWC technology emerge and evolve in organizations remains open.

[1] Shaila Miranda was the accepting senior editor for this paper. Stefan Seidel served as the associate editor.

Although the BWC phenomenon is novel, it is an instance of a perennial problem in information systems—understanding the emergence of IT implementation consequences. By IT implementation consequences, we mean any effects, such as new behaviors that may (or may not) evolve into recognizable new practices due to the new IT. Although prior research has provided rich insights into IT implementation, there is still limited understanding of how new behaviors emerge and how they evolve into recognizable practices from an organization's IT implementation processes. Emergence is an ongoing relational process that unfolds across multiple phases. As Seidel and Greve (2017, p. 2) observed, emergence "needs further unpacking as a description of a widespread social process [that] should be understood through theory and empirical work." Accordingly, we ask the following research question: *How do IT implementation consequences emerge and evolve in organizations?*

The emergence of IT implementation consequences has generated much research interest. Some researchers have ascribed consequences to a preexisting macrolevel structure (i.e., top-down), while others have ascribed consequences to microlevel interactions (i.e., bottom-up) (Leonardi & Barley, 2010). This is not surprising, as scholars tend to privilege one explanation over the other. Notably, scholars prefacing IT implementation consequences with macrolevel structures often take macrolevel structures for granted as "social prescriptions" (Battilana & Dorado, 2010, p. 1419) and neglect to interrogate their co-constitution with material structures (see also Essén & Värlander, 2019; Orlikowski, 2000; Orlikowski & Scott, 2008). Similarly, scholars prefacing IT implementation consequences with microlevel interactions often explain how new practices, new formal structures, or shared understandings may emerge from the situated enactments of technology (Essén & Värlander, 2019). However, by foregrounding situated enactments, they tend to background how prior enactments create the conditions for the subsequent enactment to become possible (Baygi et al., 2021).

In this paper, we conceptualize the emergence of IT implementation consequences as a multiphased process with analytically disaggregated constituent phases—though these phases are empirically interdependent. This conceptualization allows us to elucidate how IT implementation consequences arise and evolve during each constituent emergence phase. To do so, we take an assemblage approach (DeLanda, 2016). Our empirical context draws from the implementation of BWC technology in three municipal police organizations in the U.S. The assemblage approach suits our empirical context because it entails arranging and combining material and expressive[2] components to yield an assemblage (DeLanda, 2016; Nail, 2017). A process of double articulation produces material and expressive components, each having certain properties and capacities. While properties express components' characteristics, capacities depend on the interactions of components' properties to generate consequences under certain circumstances. An interesting feature of assemblages is how they emerge and grow by combining components and other assemblages to create a nesting relationship that results in successively larger-scaled assemblages. Nesting components and assemblages relativizes the distinction between micro (lower scale) and macro (larger scale) (DeLanda, 2006). It also facilitates moving seamlessly from micro to macro (i.e., bottom-up) and from macro to micro (i.e., top-down). Because an assemblage emerges from the interactions between components, moving from an assemblage at a lower scale to one at a larger scale entails moving from a prior emergence phase to the next one. This movement creates a *cascade* of properties and capacities in which each prior emergence phase creates the conditions that shape IT implementation consequences at that phase and at successive phases.

Based on our analysis of interview, archival, and observation data, we leverage the concept of ***assemblage parametrization,*** *which is a process of articulation wherein an individual or organization modulates combinations of material and expressive components along a continuum encompassing both stability and fluidity.* As an example, consider the case of regulating emerging technologies (Seidel et al., 2025) as one of assemblage parametrization. In this case, actors representing a variety of perspectives (government, industry, technology, etc.) engage in modulating combinations of material (i.e., blockchain technology) and expressive (i.e., government regulations) components along a continuum that balances societal risk (stability) and innovation (fluidity). It is a balancing act that considers which combination of blockchain technology properties (material) and government regulations (expressive) produces desired consequences for society without stifling innovation. Because the double articulation process produces material and expressive components, assemblage parametrization operates by specifying the conditions of material and expressive components based on properties and capacities. Together, the double articulation and assemblage parametrization processes and the components or assemblages they produce constitute an emergence phase. We identify three emergence phases—

[2] DeLanda's (2016) assemblage theory prefers the term "expressive" to the more familiar concept of the "social." To be consistent with DeLanda, we will use the term "expressive" when discussing assemblages, and the term "social" in other contexts.

individuation, *composition*, and *actualization*. Properties and capacities that cascade from one emergence phase create the conditions that make the next emergence phase possible.

Our study makes several theoretical contributions. First, we develop a process model showing how the interactions of properties and the actualization of capacities engender context-specific IT implementation consequences in organizations. Second, our assemblage parametrization process explicitly incorporates technology in the coevolution and mutual shaping of material and expressive components. We show how the modulation and interplay of material and expressive components act as a corrective to negative feedback and how assemblages can be used recursively. Third, we contribute to the understanding of how external agents become part of assemblages through nesting relationships that generate assemblages at larger scales. Nesting provides a framework to relativize the micro-macro relationship and explain both top-down and bottom-up views of the emergence of IT implementation consequences. Fourth, through cascading properties and capacities, we explain why emergence may not always succeed. We show how success, failure, or delay depends on the capacities the assemblage can actualize during each emergence phase. This explains the heterogeneity in IT implementation consequences reported in prior studies. Finally, we leverage assemblage theory and extend DeLanda's treatment of "social" assemblages to the sociotechnical ensembles prevalent in IS research. Our theoretical development allows us to clarify, elaborate, and contextualize assemblage concepts, making them amenable to IS research.

Related Literature

Emergence and IT Implementation Consequences in Organizations

Prior studies generally hold that IT implementation consequences emerge from "an ongoing stream of social action in which people respond to the technology's constraints and affordances, as well as to each other" (Leonardi & Barley, 2010, p. 5). In this regard, IT implementation consequences emerge as an ongoing relational process that "unfolds across a network of relationships" (Garud et al., 2015, p. 7) and through interactions of social and material components. These interactions may produce recognizable effects, such as a new behavior (Seidel & Greve, 2017) that may (or may not) converge into a recognizable practice (Essén & Värlander, 2019). For example, Goh et al. (2011) observed that the value realized from health IT (HIT) implementation emerges from the "co-evolutionary process between routines and HIT" (p. 565). Conceptualizing routines as part of the users' domain, they attributed IT implementation consequences to the interplay of social and material components.

Similarly, Edmondson et al. (2001) observed that new behaviors emerged among cardiology employees in 16 hospitals implementing an innovative new technology through a collective learning process. These studies show evidence of IT implementation consequences. However, they gloss over the emergence of IT implementation consequences. Our literature review identifies three research streams (see Table 1 and Appendix A) that ascribe IT implementation consequences to the interactions and mutual shaping of the social and the material. Researchers within each stream often provide a particularized view of the social and material relationship by emphasizing certain aspects of IT implementation consequences but not others.[3]

First, studies that adopt an institutional perspective often focus on adoption to explain IT implementation consequences (e.g., Addo & Avgerou, 2021; Davidson & Chismar, 2007; Essén & Värlander, 2019) and take a socialized view of how IT implementation consequences emerge. In positing a macrolevel social structure (e.g., logics or institutional forces) to explain top-down organizational consequences, they pay little attention to microlevel interactions. Furthermore, they assume that technology is a passive carrier (Berente & Seidel, 2022) subsumed within the preexisting social structure. For example, in explaining the failure of TradeNet implementation to curtail petty corruption in customs clearance in Ghana, Addo and Avgerou (2021) focused on the macrolevel "institutions of patronage that extend across the administration" (p. 1834) without interrogating their co-constitution with the material features of TradeNet. As such, the role of the material properties and capacities of TradeNet that enable people to do things (e.g., engage in petty corruption) remained black-boxed. Similarly, to explain the recursiveness of IT-enabled consequences, Essén and Värlander (2019, p. 1172) posited a preexisting constellation of logics as the "built-in macro-micro link" that inevitably shapes human practices. But whether or what role technology plays in the constellation of logics at the macrolevel is moot because, in the institutional logics perspective, technology is a mere carrier (Berente & Seidel, 2022; Gosain, 2004) rather than an active participant.

[3]Our review parallels Essén and Värlander's (2019) with important differences. We consider the micro-macro relationship as relative and focus on both simultaneously, rather than on one or the other. We also consider the analytical device used in empirical studies as a key differentiating factor of the various research streams in addition to their ontological stance.

Table 1. Research Streams of Process Studies of Emergence of IT Implementation Consequences

Perspective	Institutional logics	Structuration	Sociomateriality (mutual shaping and recursiveness)		Assemblages
Foundational Literature	Institutional Logics Thornton et al. (2012)	Structuration Giddens (1984) Orlikowski (1992)	Critical Realism Bhaskar (1998) Archer (1995)	Agential Realism Barad (2007) Latour (2005)	Assemblage theory DeLanda (2006, 2016) Deleuze & Guattari (1987)
Implementation phase	Adoption	Use	Use, adaptation	Use, adaptation	Adoption, use, adaptation
View of social and material shaping	The social is assumed to subsume the material; i.e., the material is a carrier rather than actively involved in social shaping	Social and material are assumed to be interdependent systems that shape each other through ongoing interaction	Social and material are assumed to be separable with properties that shape each other through constraints and affordances	Social and material are assumed to exist only through their temporally emergent constitutive entanglement	Material and expressive components have properties and capacities assumed to exist on a continuum relative to each other. Although they are independent, they imply or demand each other.
Key concepts or categories (source)	Family/religion State/market Profession Corporation Community (Faik et al., 2020)	Perception Interpretation Appropriation Enactment Alignment (Leonardi & Barley, 2010)	Mechanisms Events Experiences Retroduction Morphogenesis (Volkoff & Strong, 2013)	Materiality Inseparability Relationality Performativity Practice (Jones, 2014)	Material Expressive Properties/capacities Territorialization/ deterritorialization Coding/decoding (DeLanda, 2006, 2016)
Analytical device	Logics, affordances	Structuring	Analytical dualism, affordances	Material-discursive phenomena	Assemblage scales, parametrization
Sample studies	Addo & Avgerou (2021); Berente & Yoo (2012); Essén & Värlander (2019)	Barley (1986); Boudreau & Robey (2005); Davidson & Chismar (2007); Goh et al. (2011); Robey & Sahay (1996)	Essén & Värlander (2019); Leonardi (2011); Strong & Volkoff (2010)	Cecez-Kecmanovic et al. (2014); Orlikowski & Scott (2014, 2015)	Aroles & McLean (2016) Hanseth & Modol (2021) Hoffman & Novak (2017) Rodon & Silva (2015) Vuorinen & Tetri (2012)

Second, studies that adopt a structuration perspective typically focus on human agency (Barley, 1986; Boudreau & Robey, 2005; Goh et al., 2011; Robey & Sahay, 1996) to explain the emergence of IT implementation consequences. They eschew enduring structures (Giddens, 1984; Orlikowski, 1992), focusing instead on bottom-up explanations of how microlevel interactions generate emergent structures and their consequences. However, as Orlikowski (2000, p. 258) observed, structuration studies' "presumption that technologies embody particular stable structures is nevertheless problematic because it depicts technologies as static and complete artifacts with a built-in array of fixed and predictable structures." For example, leveraging adaptive structuration to explain the coevolution of routines and HIT, Goh et al. (2011) conceived the HIT as static, positing that two forms of agentic action (leadership and personal innovativeness) orchestrate a virtuous cycle of coevolution. Similarly, Barley (1986) explained how social structuring emerged from CT scanner implementation in two hospitals. As the object of interpersonal scripts, the CT scanner remained static, while IT implementation consequences emerged from the interactions between

physicians and technicians. As such, structuration studies often downplay the role of technology in emergent practices. While scholars describe the technology they study, they often fail to adequately account for its impact on the consequences that emerge (Leonardi & Barley, 2010).

Additionally, structuration studies' concern with people's situated use of technology in their daily activities often neglect questions about why a technology was adopted in the first place. As Davidson and Chismar (2007) observed, "*why* a technology was implemented tends to fall outside this micro-to-macro analytic framework" (p. 741, emphasis in original). By privileging situated actions, structuration studies tend to background prior enactments, downplaying their role in creating the conditions that make the subsequent enactment possible (Baygi et al., 2021). Accordingly, Davidson and Chismar (2007) adopted a multitheoretic perspective, leveraging institutional forces and role- and network-based structuring to attempt to incorporate both micro and macro views. Their motivation is that "investigating how change arising from the macro-institutional environment interacts with micro-level technology-triggered change may provide a more complete understanding of technology and social structure alignment" (p. 740). This motivation informs the third research stream.

Influenced by the structuration approach, scholars within the third research stream have built on the recursiveness and interdependence of social and material agencies. Essén and Värlander (2019, p. 1156) referred to this stream as "recursiveness" studies, focusing on co-constitution and the mutual shaping of the social and material to highlight how technology use, and social processes mutually constitute each other (Essén & Värlander, 2019; Leonardi, 2011; Orlikowski & Scott, 2014). Also referred to as sociomateriality, this stream has two variants: one based on critical realism (Leonardi, 2013) and the other on agential realism (Orlikowski & Scott, 2008). Critical realist studies (e.g., Essén & Värlander, 2019; Volkoff et al., 2007) consider technology to be a material structure that predates human action. As such, IT implementation consequences, such as the transformation of social structures and modifications of the technology's material features, arise from technology-afforded human action.

On the other hand, agential realist sociomateriality studies (e.g., Orlikowski & Scott, 2014) ignore preexisting structures and consider the social and material to be inseparably entangled (Orlikowski & Scott, 2008; Suchman, 2007). For example, in studying the implementation of online social media ratings on TripAdvisor, Orlikowski and Scott (2014) discounted the notion of valuation schemes as given. They found online ratings to be "emerging, fleeting, dynamic, variable, open-ended [and] reprogrammable to reflect current interests" (p. 884). Notwithstanding differences in how critical realist and agential realist sociomateriality studies conceptualize the relationship between the social and the material, both explain IT implementation consequences as emerging through microlevel interactions but rarely explain the coevolution of social and material structures at the macrolevel. As such, the problem of explaining top-down and bottom-up emergence of IT implementation consequences remains.

In summary, although prior research has provided rich insights into IT implementation consequences, there is still a limited understanding of their emergence and evolution. Our study builds on existing studies to enhance our understanding of this process. We do so by analytically disaggregating the emergence of IT implementation consequences into constituent emergence phases. Each phase offers a window into how material and expressive components interact, culminating in components or assemblages. Components and assemblages have properties and capacities that cascade from one emergence phase to another, engendering IT implementation consequences. The assemblage approach (see Table 1, shaded column) provides the vocabulary and analytical framework to examine this process.

Assemblage View of IT Implementation Consequences

We draw on DeLanda's (2006, 2016) assemblage theory to explore how organizations arrange and combine old and new material and expressive components to generate IT implementation consequences. Assemblage refers to "the action of matching or fitting together a set of components, as well as to the result of such an action: an ensemble of parts that mesh together well" (DeLanda, 2016, p. 1). In this regard, assemblage entails both the process and consequence of assembling. The components of an assemblage are either *material* or *expressive*. As DeLanda (2016, p. 20) emphasized: "To properly apply the concept of assemblage to real cases, we need to include, in addition to persons, the material and symbolic artifacts that compose communities and organizations." An assemblage's components are involved in territorializing and coding processes that stabilize and strengthen its identity. Table 2 provides definitions of assemblage concepts and examples from BWCs in police organizations.

Table 2. Assemblage Concepts and Definitions

Concept	Definition	Example
Material	A set of things, bodies, and artifacts that can be arranged and put to work in an assemblage. (Deleuze & Guattari, 1987)	BWC, viewer
Expressive	A set of statements, affects, and gestures, including speech acts that can put material components to work. (Buchanan, 2015; DeLanda, 2006)	BWC policy
Territorialization	The processes that define or sharpen spatial boundaries, or the non-spatial processes that increase an assemblage's homogeneity. As a parameter, territorialization measures the degree to which an assemblage's components are configured to form a coherent whole, are drawn from a homogeneous repertoire, or the degree to which an assemblage homogenizes its own components (DeLanda, 2006, 2016)	Selective entrance criteria, or routinization of behavior
Coding	The role played by expressive components, such as language, in consolidating the identity of the assemblage. As a parameter, coding measures the degree to which the identity of the assemblage is constituted and maintained by language (DeLanda, 2006, 2016)	Drafting policies and procedures

Table 3. Examples of Components and their Properties and Capacities

Component	Example	Property	Capacity (to)
Material	Body-worn camera (BWC)	Video encoder (MP4)	Record
	iPhone	Screen resolution	Display text and images
	Pistol	Range	Kill
Expressive	Police department	Jurisdiction	Enforce laws
	Police officer	Rank	Investigate crime
	Policy document	Statements	Guide action

Assemblage Properties and Capacities

Material and expressive components have properties and capacities. Properties define a component's characteristics or attributes. However, components are rarely tested for their properties. Instead, they "are described in terms of what they might do under certain circumstances" (Churchman, 1971, p. 11). A component's capacities define what it can do under certain circumstances. As such, capacities are innumerable, flexible, and adaptive (DeLanda, 2006). Take, for example, the interaction of a uniformed police officer (expressive component) and a firearm (material component). Both have properties that define them. Under certain circumstances (e.g., self-defense), the officer may have the capacity to discharge their firearm. However, that capacity remains latent until a situation arises where (1) the officer's life may be in danger, and (2) the officer has a firearm loaded and ready to discharge. Pressing the trigger actualizes the capacity to discharge the firearm. Thus, while properties can be specified without reference to anything else, capacities to affect must always be specified in relation to capacities to be affected (DeLanda, 2002). As such, an important analytical exercise in assemblage theory is characterizing components by their properties and capacities. The enumeration of properties and capacities makes explicit what a component is and what it can do. Table 3 lists examples of components with properties and capacities in our study.

Component Interactions, Emergent Properties and Capacities

While material and expressive components have properties and capacities, their combination and interactions generate assemblages with new properties and capacities that the components do not possess. For example, a group of workers and their equipment may comprise a work team assemblage with the novel property of teamwork, which is not reducible to the individual team members. Thus, teamwork emerges from team members' interactions, but no team member has the property of teamwork. [4] At the same time, once an assemblage emerges with novel properties, the interaction of those properties can condition the emergence of new

[4]A familiar example is the chemical interaction of oxygen and hydrogen to form water. Water has properties not possessed by its components: oxygen and hydrogen are gases at room temperature while water is liquid. Water has capacities distinct from those of its parts. Adding oxygen or hydrogen to a fire fuels it, while adding water extinguishes it (DeLanda, 2016).

capacities for the assemblage. When these capacities are actualized, they can, in turn, affect the assemblage's components. For example, a work team assemblage with the novel property of teamwork may have the capacity to impose rules and regulations on team members, such as attending meetings. Exercising this capacity (i.e., imposing rules) can constrain or enable team members. We refer to properties and capacities that exist because of the relationship between their components as *emergent properties* and *capacities* (DeLanda, 2016; Nevo & Wade, 2010).

It is important to emphasize that capacities "connote the potential for certain types of actions or behaviors" under certain circumstances (Nevo & Wade, 2010, p. 168). For example, consider the capacity to document digital evidence during a police-civilian interaction. While this capacity depends on the emergent property of embodied BWC,[5] it remains a potential until specific actions are taken (e.g., the police officer activates the BWC) under certain circumstances (e.g., the police officer pulls over a speeding motorist). If the action is thwarted either because the police officer neglects to activate the BWC or because the BWC malfunctions, the potential will not be actualized, and the capacity to document evidence will remain unrealized even though the emergent property exists. Similarly, the capacity to document digital evidence may not be actualized until there is evidence to be collected and the police officer activates the BWC. If the police officer patrols the streets with an embodied BWC all day without encountering any circumstance that demands documenting digital evidence, the capacity to document digital evidence remains latent. Thus, emergent properties and capacities are context-specific aspects of the assemblage, not of their components (DeLanda, 2016; Nevo & Wade, 2010). Figure 1 illustrates relationships between components, properties, and capacities in our study.

The capacity of the assemblage can change depending on the relationship and interactions between components. If the components mesh well, the interaction will enhance their capacities and the overall capacity of the assemblage, generating a desirable outcome. If the components do not mesh well, the interaction will diminish their capacities and the overall capacity of the assemblage, generating an undesirable outcome (Deleuze, 1988). This perspective suggests that we can evaluate an assemblage's capacities against set goals by indicating whether or not they engender desirable outcomes. Accordingly, enumerating components' properties and capacities and maintaining the distinction between emergent properties and capacities can explain how assemblages emerge and how they produce a recognizable effect.

Emergence, Assemblage Scales, and Nesting

Emergence means the appearance of novel features, such as new objects, practices, behaviors, or relations (Garud et al., 2015). In organizations, the arrangement and combination of elements, including social interactions, may (or may not) culminate in the emergence of new structures, behaviors, or recognizable practices. In this sense, emergence may fail to converge, be delayed in converging, or succeed. Successful emergence is the culmination of a recognizable new effect, such as a new behavior and its legitimation in an organization into a recognizable practice. It marks the delineation of boundaries and the integration of contextual factors that make an emergent object or practice distinct and consequential (Seidel & Greve, 2017). Moreover, because emergence does not appear ex nihilo, the arrangement and combination of components exhibit new or not-yet-seen qualities (i.e., properties and capacities) (North, 2013).

The arrangement and combination of components support the logic of nested levels (Garud et al., 2015) or scales, which underpins the assemblage approach. The assemblage approach provides a framework to locate entities at any given scale, including micro, meso, or macro, and elucidate the connections between them (DeLanda, 2006). This is because, as wholes with new properties and capacities that emerge from the interactions between parts, we can create successively larger-scaled assemblages by combining existing components and assemblages. Connecting assemblages at successively larger scales creates a cascade of nesting relationships.

Figure 2 illustrates our analytical framework and the cascading and nesting relationships between components, properties, capacities, and assemblages at successive scales. Material and expressive components are the basic elements at the lowest scale, S_1. When combined, their properties interact, composing a new *Assemblage 1* at a larger scale, S_2. *Assemblage 1* is qualitatively different from and has emergent properties and capacities not possessed by its components (DeLanda, 2016; Nevo & Wade, 2010). If *Assemblage 1* encounters other components or assemblages external to it, the interactions between them will generate a new *Assemblage 2* at a larger scale, S_3. *Assemblage 2* is qualitatively different from and has emergent properties and capacities not possessed by *Assemblage 1*.

[5] Affixing a BWC to a police officer generates the emergent property of embodied BWC. This emergent property is not possessed by the BWC or the police officer but by the one-to-one relationship between them. As long as this relationship exists, the emergent property will exist.

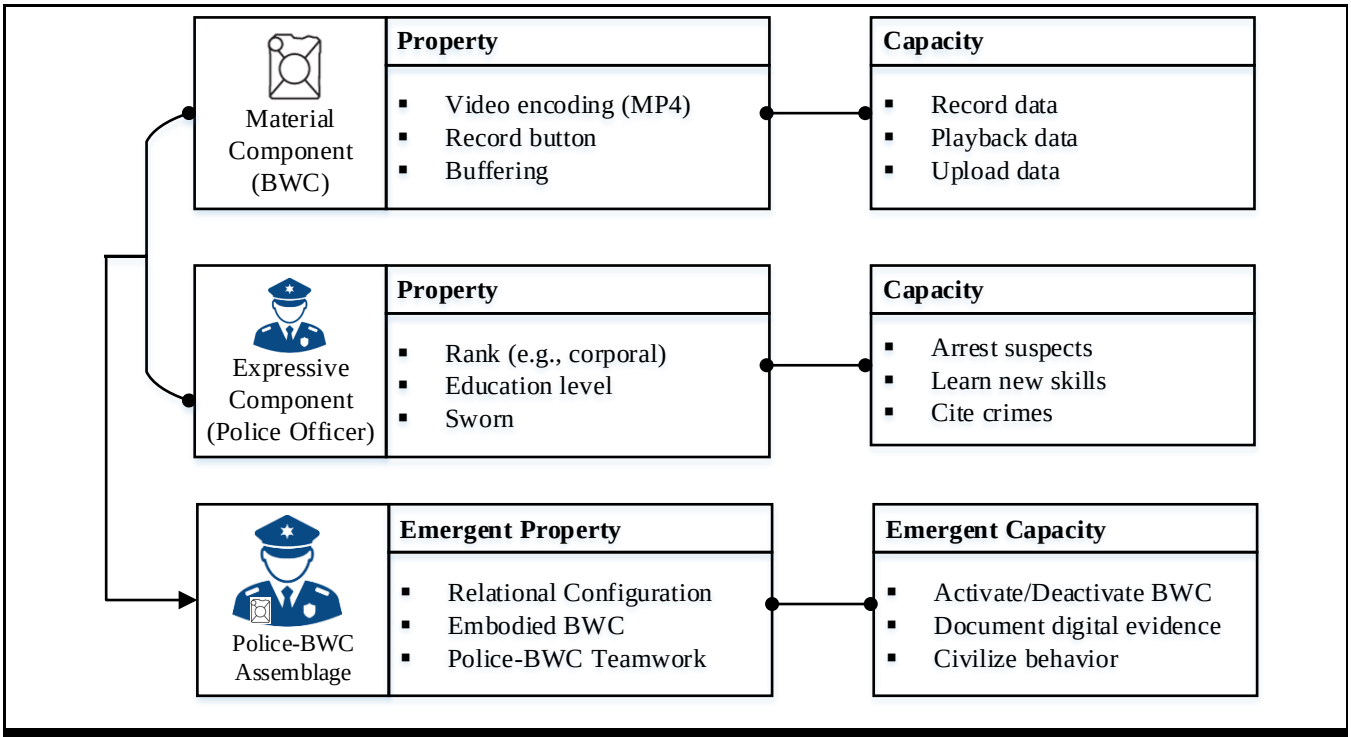

Figure 1. Component Interactions, Emergent Properties and Capacities

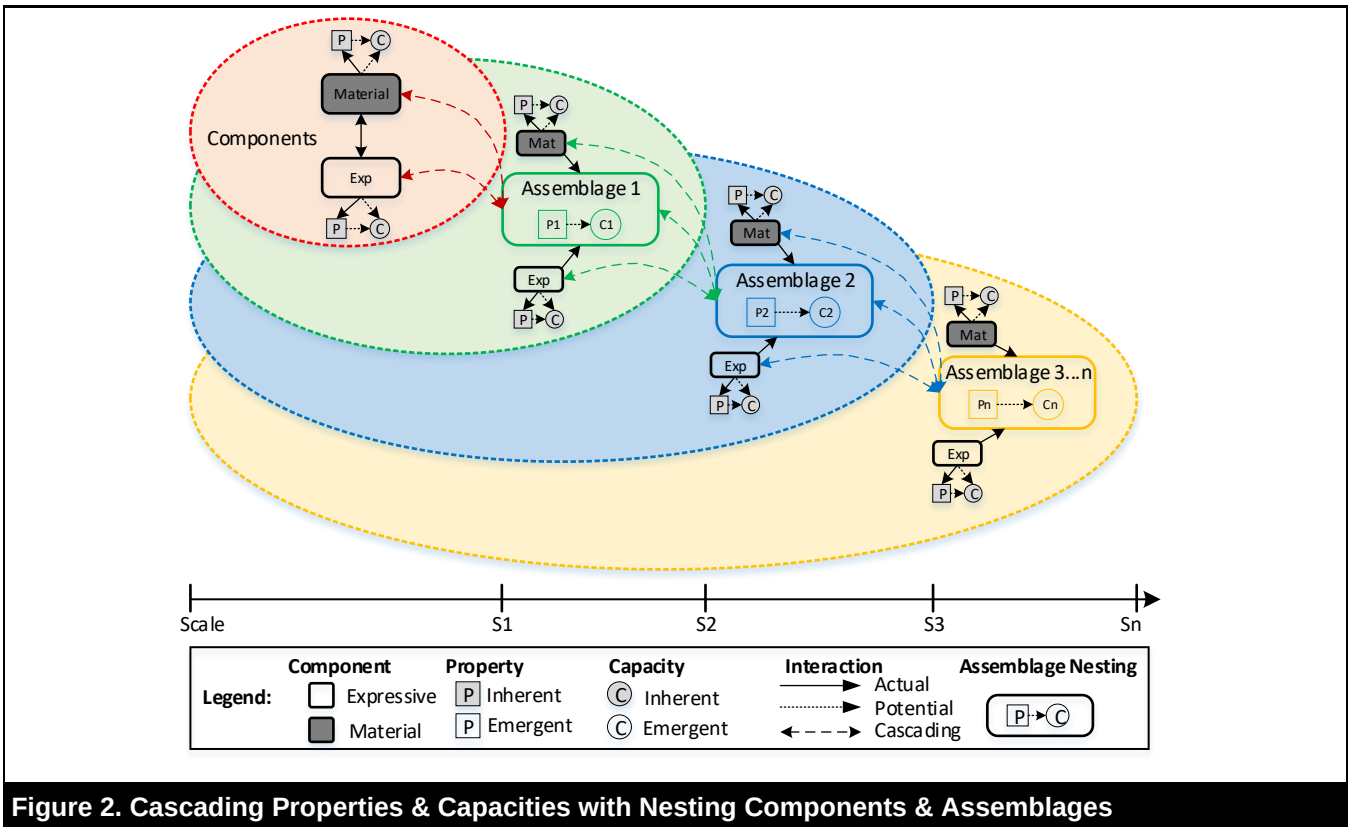

Figure 2. Cascading Properties & Capacities with Nesting Components & Assemblages

Additionally, the components from one assemblage scale (say, S_1) can interact with components at another assemblage scale (say, S_2), as indicated by the dashed bidirectional arrow lines, to condition emergent properties and capacities that cascade from one assemblage scale to the other. This process creates a nesting relationship, resulting in assemblages at successively larger scales. The cascading of properties and capacities and nesting of components and assemblages suggest a level of complexity as we move from one assemblage scale to another. In Figure 2, the dashed lines circumscribing components and assemblages indicate their dynamic nature. That is, they are always open to new possibilities by including some components and excluding others. With any inclusions or exclusions, a new assemblage with emergent properties and capacities will emerge.

Double Articulation and Assemblage Parametrization

Regardless of scale, all assemblages are produced by a double articulation process involving the coevolution of material and expressive components and their properties and capacities. The first aspect of the double articulation produces material components, and the second aspect produces expressive components (DeLanda, 2002; Deleuze & Guattari, 1987). DeLanda (2016) introduced the concept of *assemblage parametrization* to attend to the double articulation and emphasize its dynamic and coevolving process. Assemblage parametrization identifies two parameters—*territorialization* and *coding*—that specify the conditions of material and expressive components based on properties and capacities.

Armed with territorialization and coding parameters, actors can vary the degree of stability and identity of any component or assemblage. Stability refers to a capacity for resilience and continuity amid ongoing interactions rather than a static or unchanging structure. Similarly, identity is defined by the assemblage's emergent properties, which depend on the continuing interaction among component parts (DeLanda, 2002, p. 184). We conceptualize an assemblage as existing on a continuum encompassing "stability and fluidity" (Rutzou & Elder-Vass, 2019, p. 404). This allows us to replace the binary opposition between stability and fluidity with a continuum characterizing "*phases*, like the solid and fluid phases of matter" (DeLanda, 2016, p. 19; emphasis in original). Since phases can be transformed into one another and can exist as mixtures, assemblage parametrization allows us to articulate the variability of any component or assemblage at any time by modulating different settings that specify its degree of stability and identity. It is important to emphasize that territorialization and coding parameters are not a priori good or bad, right or wrong, desirable or undesirable. A high or low parameter value does not indicate whether an outcome is desirable or undesirable. Outcomes are evaluated against set goals, and parametrization helps us to specify which combination of parameters—i.e., (high, high), (high, low), (low, high), (low, low)—are associated with which outcomes. That is, the parameters of the assemblage are indicative of consequences rather than deterministic.

To visualize parametrization, DeLanda (2016) models the two parameters as knobs on a laboratory instrument, one representing territorialization and the other coding. By turning the knobs one way or the other along a continuum, we can vary the interplay between material and expressive components, thereby shaping the assemblage's degree of stability and identity. To emphasize the non-deterministic nature of parametrization, consider the possible parameters for a police assemblage. To compose a police assemblage, we can turn the knobs to a high degree of territorialization by instituting an exclusionary selection process, which requires prospective candidates to go through an application process, interview, entrance exam, and background checks. This exclusionary selection process homogenizes candidates based on a common set of criteria. Conversely, we can turn the knobs to a low degree of territorialization by instituting an inclusionary selection process with no entry barriers for prospective candidates. This inclusionary selection process ensures the heterogeneity of candidates.

Following selection, candidates undergo training in a police academy, where they learn the policies, norms, values, and practices of policing. This coding process consolidates and strengthens the identity of the police assemblage. Territorialization and coding are essential in composing the police assemblage by eliciting different combinations of material and expressive components that produce empirically different assemblages (DeLanda, 2006). We use these insights to analyze our data from three police organizations.

Research Design

We designed a multisite case study to provide a strong base for elaborating concepts and building theory about how assemblages emerge and engender IT implementation consequences in organizations. We collected data from three police organizations that were rich in context and diverse in the experiences of actors at multiple levels of the organization. This allowed us to examine variations in empirical evidence and facilitated theoretical elaboration related to the emergence of IT implementation consequences following the deployment and use of BWC technology. Our data are related to the first author's dissertation, examining the impacts of BWCs in police organizations. At the time, the first author worked as a research analyst in a municipal office but did not work as a police officer or know the informants.

Table 4. Characteristics of Case Study Sites			
Characteristics	**Metro-PD**	**City-PD**	**Town-PD**
Population size	>600,000	>100,000	<50,000
Community type	Urban	Suburban	Town
Sworn officers+	1,434	179	47
Number of BWCs	800	150	50
Year BWC implemented++	2016	2016	2014
Video storage	Cloud	On-site/cloud	On-site

Note: +Sworn officers carry weapons and have the power to arrest and detain suspects. ++ Year the BWC program was officially implemented.

Research Context and Local Conditions of Possibility

To various extents, our three case sites discussed, piloted, and implemented BWC technology. Their main goal was to document evidence of police-civilian encounters, increase transparency and accountability, and ultimately improve the relationship between police officers and their communities. This relationship was deteriorating and escalated dramatically with the Ferguson incident in August 2014, which exposed rifts in police-civilian relationships (Harvard Law Review, 2015) and accelerated the pace of deployment of BWCs. To facilitate the deployment of BWCs, the Obama Administration created a $75 million initiative for U.S. police departments to purchase up to 50,000 BWCs (President's Task Force, 2015). Notwithstanding the national trend that catalyzed the implementation of BWCs in our case sites, prevailing local conditions played a decisive role in each case site.

Table 4 lists select characteristics of our case sites. We selected cases based on similarity in the type of organization (police) and technology involved (BWC) and by community type and size (urban, suburban, town). To preserve anonymity, we refer to the case sites as Metro-PD, City-PD, and Town-PD. In each case site, the first author directly contacted the senior leadership to explain research objectives and protocols and requested permission to contact police officers for the study. The case sites had selected or used BWC technology by 2014 and were all located in the U.S. Rocky Mountain Region.

Local Conditions of Possibility

Case 1: Metro-PD is organized into six police districts, each with over 100 sworn police officers. To address issues of transparency and accountability in police patrol, Metro-PD commissioned a study to investigate the efficacy of BWCs in police operations in 2013. The study found that a BWC program would be beneficial to Metro-PD. As such, Metro-PD launched a six-month pilot in one police district in June 2014, which coincided with the Ferguson incident in August 2014. The timing was fortuitous and gave Metro-PD headway in addressing the national fallout from the Ferguson incident. Thus, the pilot test, catalyzed by an external jolt from a destabilizing issue of national import, motivated Metro-PD to embark on a BWC program.

Case 2: City-PD is a mid-sized police department with less than 200 sworn officers located in a college town. In 2012, due to significant delays in outfitting the police fleet with in-car dashboard video cameras, the police chief decided to experiment with about 10 BWCs for officers to see how they worked. For almost two years, the pilot's limited scope produced no impetus to evaluate BWCs' efficacy. This changed with the Ferguson incident. Within a month of the incident, during a city council meeting, the mayor asked the police chief for a BWC proposal. Thus, although City-PD had considered a BWC program, an external jolt propelled their efforts to embark on a BWC program.

Case 3: Town-PD is a small-town police organization with less than 50 sworn police officers. Although the decision to implement a BWC program in 2014 was "strictly internal" with the support of the city council, it was spurred much earlier by the individual initiative of certain officers who, with tacit backing from the department, purchased and started wearing BWCs for their own protection. However, like many law enforcement agencies in the U.S., Town-PD was jolted by the Ferguson incident. According to the commanding officer-in-charge, an event like Ferguson could be managed with more transparency in police-civilian interactions. As such, Town-PD leveraged the fallout from the Ferguson incident to justify implementing a BWC program. As a small town with limited resources, program costs were a major consideration.

Data Collection and Analysis

We collected data over seven months between 2016 and 2017. To reach an appropriate level of internal validity (Lincoln & Guba, 1985), we triangulated data sources, including semi-structured interviews, direct observations, questionnaires, and archival documents (such as city council minutes, procurement documents, contracts, service level agreements, BWC policies, procedure manuals, and annual reports). All documents collected were publicly available through department websites or by request. The informants included police chiefs (the highest decision-making authority in the organization), supervisors (lieutenants and sergeants), patrol officers (occupying the lowest rung in the police hierarchy), and civilian technicians, who assisted with the technical aspects of BWC operations. This ensured the inclusion of multiple perspectives. All the informants volunteered to participate in the research by responding directly to the researchers via email following an initial broadcast message requesting voluntary participation. Table 5 summarizes data sources and categories of informants who participated in the study.

Data Analysis

We used NVivo 11 Pro to examine our data and followed a three-stage iterative coding process to identify open, axial, and selective codes (Strauss & Corbin, 1990). Appendix B details the coding process, supporting evidence, and measures to ensure trustworthiness and credibility (Lincoln & Guba, 1985). As our analysis progressed, we examined processes for identifying, selecting, consolidating, combining, configuring, and actualizing material and expressive components. We also analyzed the local conditions that triggered or catalyzed the launch of BWC programs. We consulted assemblage theory literature (DeLanda, 2006, 2016; Deleuze & Guattari, 1987) to gain theoretical sensitivity (Strauss & Corbin, 1990) and relate our analysis to extant theory. Specifically, we were sensitive to the double articulation process, which guided us in identifying events and activities that coevolved with material and expressive components. Then, we specified territorialization and coding parameters based on the properties and capacities of material and expressive components. Because we were interested in examining how IT implementation consequences emerge, we bracketed events and activities into phases, emphasizing their spatial and temporal aspects. We refer to each phase as an *emergence phase*.

We identified three emergence phases (*individuation*, *composition*, and *actualization*), each comprising a double articulation and parametrization process, culminating in material and expressive components or assemblages. Table 6 provides definitions of each emergence phase, the corresponding double articulation process, and territorialization and coding parameters.

Figure 3 shows our three emergence phases. Although the figure depicts emergence phases as linear, they are not. An emergence phase may require tweaks and course correction before cascading to the next phase. The first phase, *individuation*, begins a new assembly through the double articulation process of *selection* and *consolidation*. It entails the discursive framing of expressive components and specification of material components with properties and capacities that cascade and shape the conditions of the second emergence phase, *composition*.

In *composition*, material and expressive components are combined through the double articulation process of *configuration* and *incentivization.* Components' interactions condition the emergence of a personal (police-BWC) assemblage that is different from its constituent material and expressive components. In the personal assemblage, differences matter by considering how human multi-dimensionality (e.g., age, gender, physique, experience, etc.) invokes different responses during interactions with technology. For example, configuring BWCs with officers requires mutual adjustments, such as where to affix the BWC based on a particular officer's gender and physique (tall or short and plump or lean). These interactions generate emergent properties, such as technological embodiment, relational configuration, and the capacity to co-function if the components mesh well. The composition phase's emergent properties and capacities cascade and shape the conditions of the next emergence phase, *actualization.*

The *actualization* phase conditions the emergence of an interpersonal (police-BWC-civilian) assemblage through the double articulation process of *routinization* and *legitimization*. The interpersonal assemblage comprises the personal assemblage and an external agent (a civilian from the community). It is qualitatively different from the personal assemblage with emergent properties (e.g., co-location, co-presence, interaction ritual, public persona, etc.) and capacities (e.g., the capacity to civilize behaviors, attenuate civilian complaints, memorialize encounters, etc.) not possessed by its parts. Our analysis explicitly shows how each prior emergence phase shapes the conditions that make the next emergence phase possible.

Table 5. Summary of Data Collection

A. Interviews and observations	**Metro-PD**	**City-PD**	**Town-PD**	**Total**
People interviewed:				
Supervisor (sergeant and above)	7	3	1	11
Patrol officer	22	9	4	35
Police/civilian tech	1	2	1	4
Total interviewees:	30	14	6	50
Length of interviews (hours)	17	8	3.5	28.5 hours
Length of transcripts (pages)	360	170	75	605 pages
Direct observation (hours)	98	19	--	117 hours
B. Archival documents				
BWC policy	3	2	2	7
Request for proposal	1	1	--	2
City council minutes	2	3	--	5
Other reports	4	2	1	7

Table 6. Emergence Phases, Double Articulation, and Territorialization and Coding Parameters

Emergence phase	**Definition**	**Double articulation process**	**Territorialization and coding parameters**
Individuation	The discursive framing of components' properties and capacities, involving identifying features, defining specifications, stipulating policies, and formulating proposals through the double articulation process of *selection* and *consolidation* **Emergence**: In our context, the process of *selection* and *consolidation* conditions the *emergence* of material and expressive components	***Selection*****:** Specifying, choosing, and acquiring BWC components from various sources ***Consolidation*****:** Stipulating BWC policies and procedures	The degree to which *selection* assures the quality and consistent performance of material components The extent to which the organization develops policies and procedures that are tailored specifically toward BWC use
Composition	The combination of new and existing material and expressive components and the interaction of their properties and capacities through the double articulation process of *configuration* and *incentivization* **Emergence:** In our context, *configuration* and *incentivization* condition the *emergence* of the personal police-BWC assemblage with new behaviors, such as wearing BWCs, performing function tests, etc.	***Configuration*****:** Assigning, pairing, and connecting components ***Incentivization*****:** Orientation to new training, incentives, and cognitive skills that encourage new attitudes and enactment of new behaviors	The degree of tightness or conformity of material components (including the body of the police officer) to function seamlessly as one entity The extent to which the BWC policy articulates rights and obligations that promote new behaviors and attitudes of police officers
Actualization	Putting an assemblage to work and interacting with other components or assemblages through the double articulation process of *routinization* and *legitimization* **Emergence:** In our case, *routinization* and *legitimization* condition *emergence* of a police-BWC-civilian assemblage with new behaviors and practices, such as patrolling with BWCs, writing detailed and accurate reports, etc.	***Routinization*****:** The systematic performance of regulated activities ***Legitimization*****:** Rules and procedures that provide mutual endorsement and accreditation of participants in an encounter	The degree to which material components perform reliably and are used consistently during police-civilian encounters The extent to which police-civilian interactions are based on provisions that promote transparency and mutual accountability

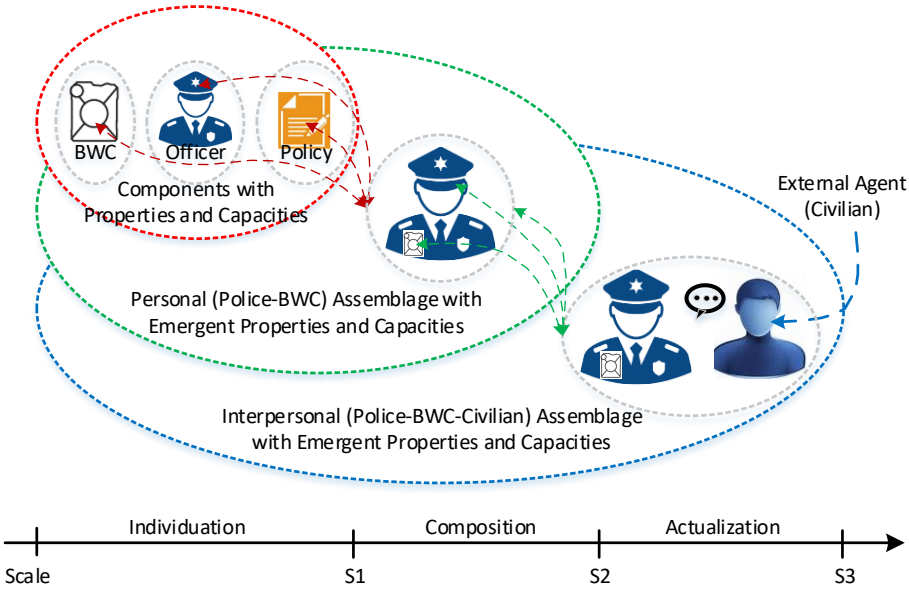

Figure 3. Cascading and Nesting of Components & Assemblages at Personal and Interpersonal Scales

Case Analysis and Parametrization

In our within-case analysis, we analyzed each case site separately. For each emergence phase, we traced each site's process to obtain material and expressive components (i.e., the double articulation process). Then, we analyzed the properties and capacities of material and expressive components to specify their territorialization and coding parameters, respectively. Our specification reflects the organizations' goals and policing context, where stability is valued over flexibility. As such, at each emergence phase, if both territorialization and coding parameters are high, then the components' properties mesh well and enhance their and the overall capacity of the assemblage. If the territorialization and coding parameters are both low or mixed (i.e., one high and the other low), then the components' properties do not mesh well, which diminishes their and the overall capacity of the assemblage. Table 7 summarizes our process for specifying territorialization and coding parameters.

Again, we emphasize that whether the assemblage's consequences are desirable or undesirable is not a function of the specified parameters but the organization's set goals. Below, we explain how each case site identified and obtained material and expressive components (the double articulation process) and how the properties and capacities of material and expressive components informed our specification of territorialization and coding parameters (assemblage parametrization) during each emergence phase.

Phase 1: Individuation

In individuation, the first emergence phase, the double articulation process consists of *selection* and *consolidation* of material and expressive components, respectively. *Selection* entails identifying and obtaining material components by organizational actors. *Consolidation* entails the discursive framing of rules and policies by organizational actors. Accordingly, the individuation phase culminates with the emergence of *material and expressive components.* We discuss and summarize the key actions and activities that shaped individuation in our case sites and how we specified territorialization and coding parameters below.

Case 1—Metro-PD: Reflecting the local conditions of possibility, Metro-PD's individuation phase was informed by a six-month pilot, which provided an opportunity to learn and test the efficacy of the properties and capacities of material and expressive components. For the material components (i.e., BWC, cell phone/viewer), Metro-PD's *selection* process leveraged knowledge from the pilot to identify and obtain material components through a request for proposals (RFP). The RPP established criteria for the quality and efficacy of material components, ensuring that they were obtained from a reputable source and had coherent spatial configuration and interactions. Because the *selection* process ensured the quality and coherence of material components, we specified MetroPD's territorialization parameter as high.

Table 7. Specifying Territorialization and Coding Parameters		
Parameter	**High**	**Low**
Territorialization (Material)	Material components are homogenized or are drawn from a homogeneous repertoire, or components have coherent spatial configuration and interactions.	Material components are not homogenized or drawn from a homogeneous repertoire or do not have a coherent spatial configuration and interactions.
Coding (Expressive)	Expressive components clearly articulate rules, rights, and obligations with effective enforcement mechanisms.	Expressive components do not clearly articulate rules, rights, and obligations, and enforcement mechanisms are lax.

For the expressive components, Metro-PD's *consolidation* process entailed convening internal and external stakeholders to review and discuss proposed policies to facilitate the smooth functioning of the BWC program. These discussions culminated in promulgating a BWC policy posted on Metro-PD's website and Facebook account to solicit stakeholder input. By developing a policy specifically for the BWC program, Metro-PD's expressive component consolidated and strengthened the assemblage's identity. Because the *consolidation* process articulated specific BWC policies, we specified Metro-PD's coding parameter as high. Accordingly, in Metro-PD's double articulation process of *selection* and *consolidation*, the attendant territorialization and coding parameters were high.

Case 2—City-PD: Despite local conditions of possibility, the pilot in City-PD was ad hoc and limited in scope. As such, it provided little, if any, learning experience. For example, the mayor's intervention influenced the *selection* process for material components, resulting in City-PD signing a sole-sourced contract rather than issuing an RFP to solicit broader vendor participation. As it turned out, the material components supplied by the vendor lacked the requisite properties and capacities to meet the organization's needs and ultimately turned out to be subpar. Since the *selection* process produced subpar material components that did not have a coherent spatial configuration, we specified City-PD's territorialization parameter as low.

Regarding the expressive component, City-PD's *consolidation* process entailed the police chief instructing management staff to revise an existing general order (policy) for dashcams "to include verbiage on body cameras." The management staff did not post the draft policy in a public forum to canvass public opinion and leverage stakeholder buy-in. In addition, the dashcam policy was not specifically developed for the BWC program and lacked provisions to incentivize officers. Because the *consolidation* process did not articulate rules and policies specific to the BWC program, we specified City-PD's coding parameter as low. Thus, in City-PD's double articulation process of *selection* and *consolidation*, the attendant territorialization and coding parameters were low.

Case 3—Town-PD: When the City Council decided to fund a BWC program, Town-PD solicited three vendors to provide material components for testing. After two months of testing, Town-PD selected one "due to the cost of the system." For example, because of the anticipated high costs for BWC data storage, Town-PD opted for on-premises server-based storage managed by the IT department rather than a more scalable cloud-based system. As it later became apparent, the vendor was circumspect in specifying its supply of BWCs and accessories. Thus, the *selection* process was opaque and lacked criteria to ensure the quality and efficacy of material components. As such, we specified Town-PD's territorialization parameter as low.

Regarding the expressive component, Town-PD's *consolidation* process did not develop a specific BWC policy. Instead, the command staff adopted a 2012 policy for using personal "portable audio/video recording devices" without canvassing public opinion. The two-page policy document did not mention any BWCs. As such, we specified Town-PD's coding parameter as low. Thus, during Town-PD's double articulation process of *selection* and *consolidation*, the attendant territorialization and coding parameters were low.

Table 8 summarizes the individuation phase in each case site. We highlight select properties and capacities of material and expressive components generated by the double articulation process of *selection* and *consolidation*. Appendix A, Table A1, provides a detailed enumeration of properties and supporting evidence for the individuation phase in each case site.

Table 8. Individuation of Material and Expressive Components with Properties and Capacities

Double articulation process / component properties	Capacities (may or may not be exercised)	Parameters		
Selection/material		***Metro-PD***	***City-PD***	***Town-PD***
BWC with viewer and wireless connectivity	Playback on mobile devices in the field; Tag video and add notes in the field	Yes	No	No
Event buffering	Continuous recording of events	Yes	No	Disabled
Mounting options	Fits and stays in place during violent encounters	Multiple	Single	Single
Cloud storage	Access to a server anywhere, anytime	Yes	No	No
Territorialization parameter	Coherent spatial configuration	High	Low	Low
Consolidation/expressive				
RFP statements of work	Issue RFP	Yes	No	No
Public input	Leverage stakeholder support and buy-in	Yes	No	No
BWC policy	Specifically developed and tailored to the organization's program	Yes	Yes	No
Coding parameter	Strengthen identity	High	Low	Low

Phase 2: Composition

Composition, the second emergence phase, involves the combination of new and existing material and expressive components through the double articulation process of *configuration* and *incentivization*, respectively. *Configuration* entails organizational actors assigning and connecting material components. *Incentivization* entails organizational actors' orientation to new training and behaviors. During composition, components' properties and capacities cascade from the prior emergence phase, conditioning the emergence of a new entity with qualitatively different emergent properties. We call this a *personal police-BWC assemblage* (or personal assemblage for short) and discuss its emergence and consequences in each case site.

Case 1—Metro-PD: Between October 2015 and September 2016, Metro-PD combined material and expressive components in its six police districts. The *configuration* process entailed organizational actors assigning material components to each police officer and configuring a BWC user account with log-in access to a cloud-based digital evidence management system. The user account related an officer to a unique BWC, smartphone, and iPod viewer to ensure that they functioned as one entity and were uniquely identifiable and traceable. Because *configuration* ensured conformity and the seamless integration of component parts, we specified a high territorialization parameter.

For the expressive component, Metro-PD's *incentivization* process required officers to attend a two-hour training to become conversant with BWC policy stipulations and learn new attitudes and appropriate behaviors (e.g., BWC etiquette, de-escalation techniques, mutual respect, etc.), deemed necessary to use the BWC appropriately. The BWC policy delineated roles and responsibilities and stipulated punishment for violating them. The training and BWC policy stipulations oriented police officers to new behaviors, strengthening the identity of the personal assemblage. As such, we specified a high coding parameter. Accordingly, Metro-PD's double articulation process of *configuration* and *incentivization* modulated high territorialization and coding parameters. This indicates that the components of the personal assemblage meshed well and co-functioned. As a result, the assemblage generated emergent capacities that were actualized to engender new behaviors, such as police officers wearing BWCs, performing function tests, docking BWCs to upload content and charge batteries, etc. These behaviors evolved and converged into recognizable practices.

Case 2—City-PD: In October 2015, City-PD began combining material and expressive components. As the technology specialist remarked: "Each body-worn camera is configured specific to an officer during the configuration process." However, due to the poor quality of the BWCs and accessories, the *configuration* process failed to homogenize the connection between the officer and BWC as an integrated entity. In fact, the *configuration* was fraught with difficulties, such as the BWC not attaching to the officers' uniforms due to faulty mounting kits or the BWC failing to dock and connect with the server. When docking failed, the link between the BWC and the officer was severed, disrupting the relational configuration of material components into a coherent whole. As such, we specified City-PD's territorialization parameter as low.

Table 9. Composition of Personal Police-BWC Assemblage with Emergent Properties and Capacities				
Double articulation process/ component properties	**Capacities (may or may not be exercised)**	**Parameters**		
Configuration/material		***Metro-PD***	***City-PD***	***Town-PD***
Relational configuration	One-to-one officer and BWC connection	Seamless	Varied	Varied
Embodiment	Choice of mounting options to fit heterogeneous bodies and tastes	Multiple	Single	Single
Docking and uploading	Transfer evidence from BWC to server	Reliable	Unreliable	Unreliable
Territorialization parameter	Seamless integration of all components	High	Low	Low
Incentivization/expressive				
BWC training manual	Learn new practices	Yes	Limited	Limited
Behavior reinforcement	Inculcate new behavior	Yes	No	No
Policy enforcement	Enforce rules and punish violations	Strict	Strict	Lax
Coding parameter	Incentivize new behaviors	High	Low	Low

For the expressive component, City-PD's *incentivization* process required officers to attend BWC training before deploying BWCs. However, the BWC policy did not stipulate specific penalties and incentives for learning new behaviors. Additionally, the unreliable performance of the BWC caused frustrations among officers, and their disposition toward wearing a BWC became negative. To officers, wearing a BWC "feels like a burden because they [BWCs] don't work well." To the administration, enforcement of BWC policies was fraught because it was difficult to determine whether policy violations were deliberate or resulted from BWC malfunction. We specified a low coding parameter because the BWC policy and training did not incentivize new behaviors.

The failure to configure and integrate material components and the difficulty in incentivizing new behaviors indicated that the components of the personal assemblage did not mesh well. Although the new behavior of wearing BWCs emerged, it was hampered and did not converge into a recognizable practice. Similarly, docking the BWC to upload content and charge the battery did not evolve or converge into a recognizable practice.

Case 3—Town-PD: In November 2014, three months after the Ferguson incident, Town-PD began combining material and expressive components. The *configuration* process involved assigning a BWC to every sworn police officer. Each BWC was configured with a police officer's credentials, and each officer was responsible for docking the BWC and uploading videos to an on-premises server. This became a vexing issue with "the docking stations not working properly, not uploading the video." Thus, similar to the issues associated with poor quality BWCs in City-PD, the docking issues made it difficult to maintain relational configuration between the officer and BWC and, therefore, failed to integrate material components. As such, Town-PD's *configuration* process modulated a low territorialization parameter.

For the expressive component, Town-PD's *incentivization* process was marked by the lack of coding of a BWC policy. Town-PD did not specify roles and obligations specific to BWC use. The adopted "portable audio/video recording devices" policy lacked stipulations to incentivize officers' behaviors. Without clear guidance about the specific activities and behaviors appropriate for BWC use, it was difficult to enforce rules with appropriate rewards and punishments. Because the lack of a tailored BWC policy made incentivizing new officer behaviors difficult, we specified a low coding parameter.

The failure to configure and integrate material components and the difficulty in incentivizing new behaviors indicate that the components of Town-PD's personal (police-BWC) assemblage did not mesh well. Thus, although the new behavior of wearing BWCs emerged, it was hampered and did not converge into a recognizable practice. Similarly, docking the BWC to upload content and charge the battery did not evolve and converge into a practice.

Table 9 summarizes the emergent properties and capacities of the personal police-BWC assemblage generated by the composition phase in each of our case sites. Table A2 in Appendix A provides detailed enumeration of properties and supporting evidence for the composition phase.

Phase 3: Actualization

Actualization, the third emergence phase, occurs when the personal assemblage is put to work, as police officers conduct patrols and interact with civilians through the double articulation process of *routinization* and *legitimization*. *Routinization* entails organizational actors' systematic performance of regulated activities. *Legitimization* entails the mutual endorsement and accreditation of organizational actors and civilians during an interaction. An interaction is a police-civilian encounter such as a traffic stop, pedestrian contact, crisis intervention, etc., requiring police action for public safety or order maintenance. We call the assemblage generated by the interaction between a personal police-BWC assemblage and an external agent (a civilian) an *interpersonal police-BWC-Civilian assemblage* (or interpersonal assemblage for short). The interpersonal assemblage amplifies the new behavior of police officers wearing BWCs and engenders new civilizing behaviors of transparency and mutual accountability.

Each interaction defines a police-civilian encounter, and each encounter constitutes an interpersonal assemblage. Interpersonal encounters are typically brief and have a spatial and temporal boundary (Goffman, 1967), hence the emergent properties of co-location and co-presence. In our research, most interpersonal interactions (58%) lasted 10 minutes or less. We found evidence of new behaviors or new practices of the interpersonal assemblage during our ride-along observations and interviews. This entailed police officers consistently activating the BWC and the BWC performing reliably during police-civilian encounters.

Case 1—Metro-PD: Metro-PD began actualizing interpersonal assemblages between February 2016 and March 2017. The *routinization* process of the interpersonal assemblage involved a police-civilian encounter during police patrol. During our ride-along observations with Metro-PD, we witnessed 67 police-civilian encounters involving 61 activations of the BWC. These encounters revealed new behaviors and practices previously not present or recognized in police patrols, such as activating and deactivating the BWC, tagging and categorizing the video of an encounter, and using the footage for note-taking and report-writing. When asked about their reaction to the new practice of patrolling with a BWC, the constant refrain from officers was: "You got to have muscle memory." The idea of muscle memory is developing the habit of performing new actions without reflection. Developing muscle memory involved the consistent and reliable performance of the BWC and accessories. This helped to homogenize the interpersonal assemblage's components by routinizing the multiple actions of multiple police officers. As such, we specified the territorialization parameter modulated by Metro-PD's *routinization* process as high.

For the expressive component, Metro-PD promoted mutual accountability and transparency of police-civilian interactions. Metro-PD's *legitimization* process ensured that the BWC policy required officers to notify civilians of the recording of an interaction and maintain a professional demeanor in language and gestures at all times. These provisions had a civilizing effect (White, 2014) [6] on both officers and civilians and preempted confrontations during interactions. Given that officers behaved professionally during police-civilian interactions to ensure transparency and mutual accountability, we specified the coding parameter modulated by Metro-PD's *legitimization* process as high. Routinizing actions and legitimizing interactions engendered consequences that helped to rebuild trust between police officers and the community, one police-civilian interaction at a time. These actions and interactions contributed to establishing a "new normal," representing a qualitative transformation in which a hitherto destabilized assemblage crosses a new threshold to regain stability.

Case 2—City-PD: In City-PD, the *routinization* process was hampered by problems with the BWC, which were exacerbated during police-civilian interactions. During our ride-along observations with City-PD, we witnessed eight police-civilian encounters. Officers were required to record encounters with civilians in many situations, such as any type of crime in progress, anticipated use of force, assault or domestic violence, etc. However, due to technical glitches, officers apparently had no control over the activation and deactivation of the BWC and did not know whether an encounter they wanted to record was actually recorded due to problems with the on/off switch. The glitches of the material component compromised the ability of officers to develop the muscle memory required for the routinization of actions. As such, we specify a low territorialization parameter.

Regarding the expressive component, City-PD's *legitimization* process did not require officers to notify civilians before recording an encounter, which compromised the benefit of the civilizing effect on civilians and officers. In addition, the BWC policy authorized supervisors to review BWC footage of subordinate officers randomly. This form of surveillance had a chilling effect on officers, who referred to it as "Big Brother is watching." Another difficulty was the contradiction between what the BWC policies required officers to do and what the technology allowed them to do. For example, the policy requiring officers to complete reports when they take a suspect to jail failed to consider that the BWCs did not allow officers the capacity to review BWC footage at the jail, thereby

[6]The civilizing effect is a consequence of improved behavior—officer behavior, citizen behavior, or both. Though we didn't directly interact with civilians, our observations and anecdotal evidence from officers suggests that the personal police-BWC assemblage had a civilizing effect on both.

compromising their ability to write accurate reports. As such, we specified the coding parameter modulated by City-PD's *legitimization* process as low.

City-PD made serious attempts to fine-tune the interpersonal assemblage by working with the vendor to repair and replace defective components. Notwithstanding these efforts, problems persisted, and City-PD lost confidence in the interpersonal assemblage. As a result, the emergence of new behaviors and convergence into recognizable practices failed. By the end of the first quarter of 2016, less than six months after the actualization of the interpersonal assemblage, the police chief, with the support of the city council, decided to officially terminate the BWC contract with the sole-sourced vendor. City-PD decided to return to the drawing board for another attempt to develop a BWC program.

Case 3—Town-PD: In Town-PD, the poor quality of the BWC component and lax enforcement of BWC policies surfaced with officers patrolling with a BWC. Because we did not observe police-civilian interactions in Town-PD, our interpretations of how the interpersonal assemblage was put to work and how the *routinization* process unfolded are based solely on interviews with officers. The technical glitches persisted, and the BWC and accessories continued to be unreliable, including, as the deputy commander puts it: "the [BWC] system itself inadvertently turning on, turning off, the battery packs expanding and overheating causing issues or concerns for the officer as far as explosion of the battery pack and so forth." The glitches of the material component made it difficult for officers to develop the muscle memory required for the routinization of actions. As such, we specified Town-PD's territorialization parameter as low.

Notwithstanding the technical glitches and the fact that Town-PD did not specifically develop a BWC policy to stipulate actions of mutual accountability and transparency, officers endorsed using the BWC in police-civilian encounters. From interviews with officers, we made inferences about the *legitimization* process by discerning how officers feel about the BWC program and how they perceive their interactions with civilians. In general, officers perceived their interactions as positive. As one officer noted: "For the most part, the public welcomes the fact that we are wearing cameras. I have more people like, wow, you guys are wearing cameras? Yes. That's awesome." Thus, despite the challenges hampering the routinization of new behaviors, the *legitimization* process was encouraging and ongoing. As such, we specified the coding parameter as "ambiguous." Town-PD's *routinization* and *legitimization* process conditioned the emergence of an interpersonal assemblage in which components did not mesh well since it was low in one parameter (territorialization) and ambiguous in another (coding).

We explain the mixed parameters in Town-PD's actualization phase by noting that the Ferguson incident did not destabilize the organization. According to a senior command officer, the decision to implement BWCs was aimed at preventing an incident like Ferguson from happening in the community. The commander believed that an incident like Ferguson could be prevented if police-civilian interactions were transparent to the community. As a result, despite the challenges of the material component, the organization accepted the consequence of a delay in the convergence of new practices and behaviors.

Table 10 summarizes the emergent properties and capacities of the interpersonal police-BWC-civilian assemblage during the actualization phase. Appendix A, Table A3 provides a detailed enumeration of properties and supporting evidence for the actualization phase, and Appendix B provides supporting evidence for emergent properties and actualized capacities.

Table 10. Actualization of Interpersonal Assemblage with Emergent Properties and Capacities

Double articulation process/component properties	Capacities (may or may not be exercised)	Parameters		
Routinization/material		**Metro-PD**	**City-PD**	**Town-PD**
Consistent activation/deactivation	Develop muscle memory	Yes	No	No
Tagging and note-taking	Accuracy of reports	Yes	No	No
Evidence documentation	Memorialize encounters	Yes	Partial	Partial
Local visualization	Enhance recollection of events	Yes	No	No
Territorialization Parameter	Consistent performance of regulated activities	High	Low	Low
Legitimization/expressive				
requiring civilian notification	Preempt hostile interactions	Yes	No	No
De-escalation techniques (gestures and language)	Civilize behavior	Yes	No	Yes
random viewing of videos	Surveillance of officers	No	Yes	Yes
coding parameter	Mutual support and endorsement	High	Low	Ambiguous

Discussion

This study brings to light an assemblage approach to explain the emergence of IT implementation consequences in three police organizations. Each organization embarked on implementing BWC technology under different local conditions of possibility catalyzed by an exogenous event. Our analysis of the activities and processes for implementing BWC technology in each organization found that the emergence of IT implementation consequences unfolds in three analytically disaggregated phases, culminating in components or assemblages with emergent properties and capacities. By actualizing capacities, new behaviors emerged among the officers. These include wearing a BWC as part of the police uniform, performing function tests to ascertain the BWC's configuration and operational fitness, activating and deactivating the BWC while on police patrol, and docking the BWC to upload recordings and charge the battery. New behaviors may (or may not) evolve and converge into recognizable practices. For example, wearing a BWC as part of the police uniform and performing function tests evolved and converged into recognizable practices when both behaviors became mandatory for officers to participate in patrol functions. However, activating and deactivating the BWC to record police-civilian encounters converged into a recognizable practice only when the BWC performed consistently and penalties for nonactivation were enforced. It failed to converge or convergence was delayed when the BWC performed inconsistently or penalties for nonactivation were lax.

Interestingly, our three organizations had divergent patterns of emergence of new behaviors and practices. While new behaviors emerged in all three organizations, they only successfully evolved and converged into recognizable new practices in one organization, Metro-PD. They failed to evolve and converge in City-PD and convergence was delayed in Town-PD. We leveraged these insights to develop a process model of the emergence of IT implementation consequences in our organizations.

Figure 4 depicts our model with three analytically disaggregated emergence phases (*individuation*, *composition*, and *actualization*). Each emergence phase involves double articulation and assemblage parametrization processes, emphasizing the coevolution and mutual shaping of material and expressive components. By being explicit about how material components (e.g., BWC technology) coevolve with expressive components (e.g., BWC policy), our assemblage approach builds on structuration studies of mutual shaping and recursiveness, which take an implicit or embedded view of technology (Leonardi & Barley, 2010; Orlikowski, 2000). Despite having similar processes, each emergence phase culminates in something qualitatively different—*components*, a *personal assemblage*, and an *interpersonal assemblage*—suggesting heterogeneity in components' interactions and their emergent properties and capacities. As discussed earlier, capacities define what a component or assemblage can do under certain circumstances and remain latent until actualized.[7] Accordingly, in each emergence phase, we can ascertain the emergence of IT implementation consequences if capacities are actualized and new behaviors or practices emerge. If capacities are not actualized, the emergence phase fails or the engendering of new behaviors or practices is delayed, sending negative feedback to elicit further assemblage parametrization and course correction. The ongoing interaction between actors' role in assemblage parametrization and the emergence of IT implementation consequences underscores the recursive nature of assemblages and their amenability to structuration (Barley, 1986; Orlikowski, 1992).

Finally, the cascading of emergent properties and capacities from one emergence phase to the next shapes the conditions that make the emergence of IT implementation consequences possible at each successive phase. This unpacks the emergence process (Seidel & Greve, 2017), showing that although analytically disaggregated, it constitutes an ongoing relational process (Garud et al., 2015) with empirically interdependent emergence phases. We discuss the model's emergence phases and implications below, emphasizing how each phase builds on and extends the extant literature on the emergence of IT implementation consequences.

Individuation and Discursive Framing of Material and Expressive Components

Our model starts with local conditions of possibility influenced by endogenous and exogenous jolts, prompting organizational actors to engage in individuation, the first emergence phase. This entails the specification of material components and discursive framing of expressive components through the double articulation process of *selection* and *consolidation*. The discursive framing is essential because, as Miranda et al. (2022) showed in the case of blockchain, before actors can recognize anything, such as a behavior or practice, as emergent, they need a discourse to theorize about its possible effects (i.e., its properties and capacities). Then, actors can justify or contest the claims of such effects based on their evolution and convergence in subsequent phases of emergence (Seidel & Greve, 2017). Discursive framing can highlight the conditions and context-specific requirements reflected in components' properties and capacities.

[7] We refer to the third emergence phase as "Actualization." We also discuss actualized capacities or actualization of capacities to indicate when a latent potential is exercised or becomes activated.

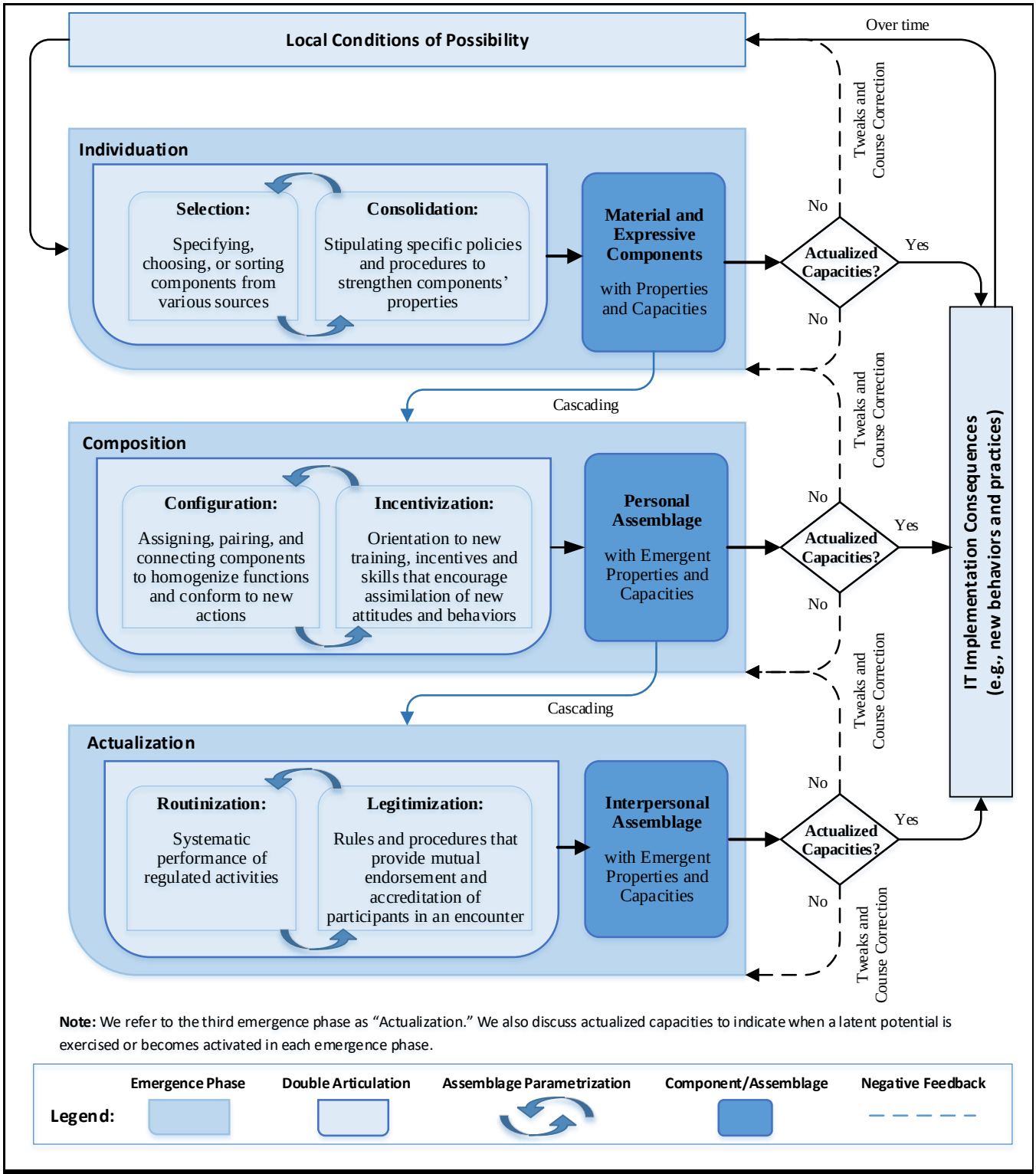

Figure 4. Process Model of Emergence of IT Implementation Consequences

Unfortunately, many institutionally inspired studies of the emergence of IT implementation consequences frequently skip this first emergence phase by positing exogenous institutional forces as the sources of emergence (see Addo & Avgerou, 2021; Davidson & Chismar, 2007; Essén & Värlander, 2019). For example, in trying to explain the recursive mechanism involved in the shift in institutional logics in Swedish Rheumatology, Essén and Värlander (2019, p. 1172) posited a "built-in macro-micro link" as the source that inevitably shaped microlevel interactions. By so doing, they pay less attention to the actions of endogenous actors, who are an essential source of emergent behaviors and practices. Our study focuses more on endogenous actors and their distinctive role in organizations' discursive framing of components' properties and capacities. Paraphrasing Orlikowski (2000), how people talk about the properties and capacities of material and expressive components has profound implications for the emergence of IT implementation consequences in organizations.

In our analysis, the 2014 Ferguson incident and the subsequent Federal response stand out as the external jolt that catalyzed BWC deployment in police organizations. However, by closely examining each organization's local conditions of possibility, we observed that discursive framing and actions by central and peripheral internal actors ignited the initial sparks for the requisition of material and expressive components. For example, in our research, the actions of central actors (command staff) triggered discursive framing in Metro-PD and City-PD. In Town-PD, a low-level patrol officer who felt that the process of resolving civilian complaints against police officers was not working in his favor became a critical voice advocating for the implementation of a formal BWC program. All three organizations acquired material and expressive components reflecting each organization's unique local conditions of possibility. Thus, while the Ferguson incident served as a catalyst, the central actions of the command staff and the peripheral actions of a marginal internal actor were necessary for shaping the scope and quality of material and expressive components.

By paying attention to endogenous actors, our assemblage approach shows how institutional approaches can incorporate microlevel actors in their analysis of emergence (Essén & Värlander, 2019). Additionally, by conceptualizing emergence as unfolding in multiple phases, we show that not only is the success or failure at the point of enactment important, as is common in sociomateriality studies (Orlikowski & Scott, 2015) but what happens before and after enactment is also relevant (Baygi et al., 2021; Cecez-Kecmanovic et al., 2014).

Composition and Emergence of a Personal Assemblage

The composition phase combines material and expressive components through the double articulation process of *configuration* and *incentivization*. In our context, the interactions of components culminated in a personal assemblage with emergent properties and capacities. Actualizing capacities can lead to the emergence of new behaviors and practices. However, there is no guarantee that new behaviors or practices will emerge. As DeLanda (2016) observed, emergence should not be "taken to be *either necessary or transcendent*" (p. 12, emphasis in original). Emergent properties and capacities will cease to exist if the parts cease to interact. This surfaces an issue with the mimetic adoption of IT solutions, which starts with preexisting components implemented for new users in a new context. After implementation in a new context, new users' interactions with technology artifacts and work processes will generate new properties and capacities that may be different from those emerging in prior implementations of the same technology (Berente et al., 2019; Orlikowski, 1996). As Faik et al. (2024, p. 220) observed: "The adoption or adaptation of ready-made digital solutions in such contexts often leads to unintended and undesired consequences." For instance, configurations of packaged software in HIT (Goh et al., 2011; Lapointe & Rivard, 2005) and enterprise IT systems (Addo & Avgerou, 2021; Boudreau & Robey, 2005) often include pre-ordained rules and processes with properties and capacities that may not actualize in the local context. This can aggravate implementation shocks (Berente & Yoo, 2012) and constrain the emergence of desired IT implementation consequences.

Our study highlights how emergent properties and capacities are sensitive to organizational heterogeneity. Different organizations provide different opportunities for context-specific properties and capacities to emerge. Because components' interactions generate emergent properties and capacities that are not present in the components, what works in one context may not necessarily work in another. An illustrative example is the failed attempt to curb petty corruption among customs workers in Ghana through the mimetic adoption of TradeNet. Although the implementation of TradeNet was deemed successful in Singapore, it failed in Ghana. The failure was attributed to "the incongruence between the institutional logics inscribed in TradeNet and Ghana's established traditional mode of governance" (Addo & Avgerou, 2021, p. 1852). TradeNet's failure to curtail petty corruption in Ghana reflects the heterogeneity of emergent properties and capacities in different contexts and their impact on the emergence of IT implementation consequences.

Actualization and Emergence of an Interpersonal Assemblage

Actualization, the third and final emergence phase in our study, explains how assemblages are put to work and become stabilized (or destabilized) through the double articulation process of *routinization* and *legitimization*. In our context, assemblages are put to work when police officers encounter civilians during patrols. During police-civilian encounters, the civilian, an external agent, joins an existing personal assemblage to form a larger-scaled interpersonal assemblage with emergent properties and capacities that can enhance or destabilize the assemblage based on whether capacities are actualized. For example, during a police-civilian encounter, failure to actualize certain capacities, such as civilizing officer and citizen behaviors, can destabilize the assemblage, as the 2020 George Floyd[8] incident illustrates. Given the potential for destabilization, ensuring the stability of interacting components and the actualization of capacities as assemblages become larger in scale is crucial. We emphasize that in assemblage theory, stability does not imply a static or unchanging structure but rather a capacity for resilience and continuity amid ongoing interactions. In prior studies, scholars have looked at roles (Barley, 1986; Davidson & Chismar, 2007), routines (Berente & Yoo, 2012; Edmondson et al., 2001; Goh et al., 2011), behaviors (Lapointe & Rivard, 2005), and practices (Addo & Avgerou, 2021; Essén & Värlander, 2019) as the interactional substrate for the emergence of IT implementation consequences. In these studies, stability primarily involves interactions among internal agents (i.e., those employed by or affiliated with the organization).

Our study extends prior work by incorporating external agents in the emergence of new behaviors and practices. While the outcome of internal agents' interactions can be predicted based on habit formation and routinization (Goh et al., 2011), interactions involving external agents are dynamically improvisational (Sawyer, 2015) and difficult to predict, especially in policing where encounters can be brief, contentious, and consequential. Assemblages allow us to accommodate external agents and account for how they contribute to the emergence of IT implementation consequences in two ways. First, as wholes whose properties and capacities emerge from interactions of their component parts, assemblages' components have a certain level of autonomy (DeLanda, 2016). This means they can be added to, detached from, and reattached to an existing assemblage with their properties intact. This is how external agents (e.g., civilians) join the personal police-BWC assemblage and become part of the interpersonal police-BWC-civilian assemblage in police organizations.

Second, by focusing on properties and capacities (rather than entities), we show how external agents can shape emergence through the capacities exercised by larger-scaled assemblages. Because capacities are relational (Deleuze & Guattari, 1987; DeLanda, 2016), any capacity actualized by a larger-scaled interpersonal assemblage is an emergent consequence of the interactions between lower-scaled parts. Therefore, the actualization of capacities is a source of variation in the emergent consequences of assemblages. It is instrumental in explaining how emergence unfolded in our three organizations. For example, the interpersonal assemblages in all three organizations had the capacity to memorialize police-civilian encounters, civilize officer and civilian behavior, etc. (see Appendix B, Table B1). However, only one organization, Metro-PD, successfully actualized these capacities, leading to recognizable new practices. As such, through part-whole relationships and assemblages' emergent properties and capacities, our study advances an understanding of how external agents become part of larger-scaled assemblages and how they contribute to the emergence of IT implementation consequences.

Our assemblage analysis helps explain the heterogeneity in implementation consequences reported by studies focusing on BWC's effects on policing (Ariel et al., 2016; Lum et al., 2019; Zamoff et al., 2022). For example, Zamoff et al. (2022) concluded that BWC deployment significantly reduces citizen complaints, while Yokum et al. (2017) found no effect on citizen complaints. Although these effects are attributed to BWCs, our assemblage analysis emphasizes that the BWC is part of an interpersonal assemblage in a context where interactions are brief, contentious, and consequential. These interactions introduce variability in the capacities the assemblage can actualize and which consequences ultimately emerge.

Finally, as recognizable new practices become routinized and legitimacy is taken for granted due to the consistent actualization of capacities, the assemblage can become rigid and fail to respond to environmental changes. Over time, this may affect local conditions of possibility and trigger emergence anew.

Theoretical Contributions

Our study makes several theoretical contributions. First, we develop a process model showing that the emergence of IT implementation consequences is a multi-phased process. In each phase, new behaviors may succeed, fail, or the emergence and convergence into recognizable practices may be delayed. We unveil the process by theorizing a path from material and expressive components to the emergence of IT implementation consequences. The path shows how the interactions of properties

[8] The George Floyd incident is the interaction between George Floyd, an unarmed Black man, and three Minneapolis police officers, resulting in George Floyd's death. This incident provoked widespread demonstrations against police officers and criminal charges against the three officers.

and the actualization of capacities engender context-specific IT implementation consequences in organizations. This is not a linear process. In some instances, IT implementation consequences may emerge via negative feedback loops involving tweaks and course correction before converging into recognizable new practices. In other instances, they may fail or their convergence into recognizable practices may be delayed.

Second, our assemblage parametrization process explicitly incorporates technology in the coevolution and mutual shaping of material and expressive components. We show how the modulation and interplay of components' properties and capacities act as a corrective to negative feedback and how assemblages can be used recursively.

Third, we contribute to the understanding of how external agents become part of assemblages through nesting relationships that yield assemblages at larger scales and show that although emergence culminates endogenously, external agents can shape its consequences. By revealing how combining components and assemblages results in successively larger-scaled assemblages, nesting provides a framework to relativize the micro-macro relationship and explain both top-down and bottom-up views of the emergence of IT implementation consequences.

Fourth, by drilling down to properties and capacities, rather than focusing on entities, we explain why emergence may not always succeed and show how success, failure, or delay depends on the capacities the assemblage can actualize during each emergence phase and their cascading impact across all emergence phases. This explains the heterogeneity in IT implementation consequences reported in prior studies.

Finally, we leverage assemblage theory and extend DeLanda's treatment of "social" assemblages to the sociotechnical ensembles prevalent in IS research. Our theoretical development allows us to clarify, elaborate, and contextualize assemblage concepts, making them amenable to IS research.

Implications for Practice

Information technology can enhance the safety of workers, especially those who "perform risky, high-stake work in life-threatening environments," such as police officers (Pang & Pavlou, 2019, p. 2). Notwithstanding this positive outlook, studies on the impact of BWC technology on police officers have produced mixed results (Lum et al., 2019; Zamoff et al., 2022), suggesting that how IT enhances workers' safety requires explanation. Our research offers such an explanation for practitioners facing the challenge of managing IT implementation consequences. Our assemblage approach shows that components' properties and capacities matter. Therefore, each emergence phase requires practitioners to pay attention to the properties and capacities that emerge at that phase and their cascading impact across all emergence phases. This should guide them in developing effective context-specific strategies to generate desired IT implementation consequences.

Our findings should also sensitize practitioners to the need for a nuanced view of the emergence of IT implementation consequences. Since these may not be immediately recognizable, practitioners should be open to tweaks and course correction when consequences fail or are slow to emerge. For example, Town-PD experienced problems due to the low quality of material components, which delayed the emergence of new behaviors and the convergence of recognizable practices. However, rather than abandoning the assemblage, they chose to course-correct, using what they learned in the field to send feedback to supervisors who worked with the vendor to resolve problems with the material components.

Limitations and Future Research

Our study is extensive but not without limitations. First, our empirical data is based on cases in police organizations that are averse to change (Manning, 1997). However, they are also subject to political mandates that often leave little room to maneuver. As such, they strive to generate sociotechnical assemblages when required to do so. This could have impacted the chances of actualizing novel sociotechnical assemblages in our study. As such, we advise caution in generalizing our findings to other settings and call on future research to examine cases in different settings, such as private for-profit organizations. Second, the interpersonal assemblage in our study included police interactions with external agents (civilians) whose opinions we did not directly canvass. Although we observed these interactions, some of which were voluntarily initiated by civilians calling for service, the circumstances were not always propitious. In fact, there was often a power asymmetry as the final decision rested with the officer. Exploring these issues in future studies would help enrich our understanding of the process of incorporating external agents in assemblages. Finally, some authors construe emergence as an organized activity (Bouty & Gomez, 2015), while others see emergence as highly improvisational and less scripted (Sawyer, 2015). Our discussion of the emergence of IT implementation consequences adds nuance to these views. Our distinct emergence phases offer organizations "a well-defined repertoire of moves to choose from" (Miranda et al., 2015, p. 591). Yet the nesting of assemblages as they grow larger in scale and the conditions of actualization introduce a certain level of complexity that is less scripted. Future research should consider the extent to which emergence unfolds from organized and/or improvisational processes.

Conclusion

This paper uses an assemblage approach to explain the emergence of IT implementation consequences in organizations, accommodating both top-down and bottom-up perspectives. We examined how three organizations with varying local conditions of possibility, catalyzed by the same exogenous jolt, created assemblages by arranging and combining heterogeneous material and expressive components. We developed a process model comprising three distinct yet interdependent emergence phases with feedback loops. Our model explains how each emergence phase culminates in components or assemblages with qualitatively different properties and capacities. As we move from one emergence phase to another, adding and combining components, the assemblage becomes larger in scale, with emergent properties and capacities cascading from one emergence phase to shape the conditions that make the next phase possible.

On the one hand, cascading properties and capacities may be actualized, leading to the emergence of IT implementation consequences. On the other hand, cascading properties and capacities may not be actualized, indicating failure or delay in the emergence of IT implementation consequences. We offer theoretical and practical implications based on our findings. Thus, in responding to the call to draw on assemblage theory to explicate sociotechnical emergence (Zhang et al., 2021), we hope that our study will enable future research to push beyond the emergence of behaviors and practices into other IT implementation consequences, such as new organizational forms and functions from both bottom-up and top-down perspectives.

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Appendix A

Supporting Data for Assemblage Parametrization

Table A1. Supporting Data for Assemblage Parametrization in Individuation Phase

Parametrization	Description	Illustrative data
Selection: *The degree to which the process of selection assures the quality of material components*	**MetroPD:** (High) Formal pilot and evaluation informed specification of components' properties and capacities, which were obtained through competitive RFP process	"In June 2014, we engaged in a study with Cambridge University and with TASER International and we did a six-month study that lasted from June through December 2014. ... Towards the end of the program, we had seen several successes and then based upon that, we determined if funding was available that we were going to try to proceed." (*Sergeant11*)
	CityPD: (Low) Limited pilot with no evaluation to inform components' properties and capacities and no RFP. Vendor supplied VIEVE cameras for pilot but switched to their version of BWC that was not tested by the department.	"We had, I believe 6 or 7 officers who have the VIEVU body-worn camera and we were testing those to see if we wanted to introduce those to our department. ... The problem was the devices that we tested, the VIEVU cameras, were not what we ended up purchasing. L3 decided to start making their own." (*Tech)* "We didn't do an RFP or anything like that. We went with the current vendor that was providing our in-car video. ...We've been really surprised, very surprised, at the quality or the lack of quality that these devices have." (*Tech*)
	TownPD: (Low) Limited testing to inform specification of components and no RFP to source components	"No [we did not have a pilot]. We tested three products over a series of months. We tested VIEVU body-worn camera systems, Digital Ally, and Utilities. We elected to go with Digital Ally due to the cost of the system." (*Commander*).
Consolidation*: The extent to which the organization develops policies and procedures tailored toward BWC use.*	**MetroPD:** (High) Specific BWC policy was developed prior to the pilot, and updated after the conclusion and evaluation of the pilot to incorporate lessons learned from the pilot.	"During the pilot, they had to come up with a policy. They came up with the procedures. Some basic workflow and really that was really helpful in us implementing our full-scale program. … I'll give you an example. During the initial pilot, the officers were allowed to mute their cameras. We discovered that it then made it difficult for the officer to be aware if their camera is recording, if it wasn't, which is why we had to make some policy changes." (*Sergeant31)*
	CityPD: (Low) No specific BWC policy. Used an in-house dashcam policy, which was not informed by a pilot or evaluation.	"[City] Police Department Management Staff revised the current in-car camera general order (policy) to include verbiage on body cameras. It was adopted after it was modified by the city attorney's office and reviewed by the city manager." *(Memorandum to City Council 4/21/2015)*
	TownPD: (Low) Did not develop specific BWC policy. They adopted a prior audio/video recorder policy that was not informed by a pilot or evaluation.	*From our field notes and review of documents:* TownPD did not develop a specific BWC policy. Instead, they adopted an existing policy on audio/video recorders without modifications, despite the recommendation from the Bureau of Justice Programs that: "Having policies, procedures, training and feedback mechanisms in place and used prior to even a pilot deployment is important."

Table A2. Supporting Data for Assemblage Parametrization in Composition Phase

Parametrization	Description	Illustrative data
Configuration: *The degree of tightness or conformity of material components (including the body of the police officer) to function seamlessly as one entity*	**MetroPD:** (High) Seamless and ubiquitous connectivity between officer and BWC with viewer (i.e., relational configuration), docking station, and cloud storage material components	"The biggest thing for me is I'm short. And so, I constantly have to kind of tilt my camera up. Otherwise, all I can get is their chest. So, I've had to just maneuver my camera better." (*Officer11*) "So the officers are all provided with some sort of a viewer. ... It provides them Bluetooth access to the camera so they can watch whatever video they have and also so they can put in the correct information so that we can make sure it gets included with cases." (*Sergeant41*)
	CityPD: (Low) Connectivity between officer and BWC without viewer (i.e., relational configuration), docking station, and on-premises storage server was problematic	"And one of the selling points which we were briefed [on] was we are going with this [BWC] system because instead of wearing, you know, so I wore my body camera and then for the vehicle camera wear a microphone to be compatible with that. It's just supposed to be one thing, you turn on your lights and everything turns on and I guess that wasn't the case." (*Officer32*) "The implementation was more complex and difficult than we expected it to be ... So, we had a host of technical issues to overcome." *(Commander)*
	TownPD: (Low) Connectivity between officer and BWC, docking station, and on-premises storage server problematic.	"We've experienced malfunctions throughout the day that are not caused by humans, it's technology… the malfunctions that we've experienced have been the docking stations not working properly, not uploading the video." (*Commander*)
Incentivization: *The extent to which the BWC policy articulates rights and obligations that compel new behaviors and attitudes of police officers*	**MetroPD:** (High) Formal pilot and training reinforces learning and effective behaviors, which is coupled with strict enforcement of rules and policies for BWC use and misuse	"We have the body camera training. You go up to headquarters and you take a class. They tell you the policy, the dos and don'ts. They show you how to operate the camera, how to sync it to your iPod that they issue. It's a class that you have to take before getting the camera and it's a required class." (*Officer41)* From Article 11 of BWC Policy: Failure to adhere to the recording requirements of this policy will result in the following discipline and actions: 1st violation in a 12-month period: Written reprimand; 2nd violation in a 12-month period: 1 fined day; 3rd Violation in a 12-month period: formal discipline; Purposeful, flagrant, or repeated violations will result in more severe disciplinary action.
	CityPD: (Low) Limited training failed to reinforce policy and behaviors. This is further compounded by tension between strict enforcement of rules and poor BWC performance	"We had to sit through a training and learn how to upload the video, where to do it at. I think it was about maybe 20 minutes." (*Officer42*) "We have this new policy now where we are required to stay at the jail to type a report and you can't access your stuff from their jail servers. So, if you wanted to, you know, look back on your video [to write a report] you can't." (*Officer52*)
	TownPD: (Low) Limited training and lax enforcement of rules with unspecified penalties failed to reinforce desired behaviors	From field notes and documents review (6/9/2016): TownPD's audio/video recorder policy has no stipulations for disciplining officers for policy breaches. As such, officers may not fully appreciate the need for behavioral change required for BWC implementation.

Table A3. Supporting Data for Assemblage Parametrization in Phase of Actualization

Parametrization	Description	Illustrative data
Routinization: *The degree to which material components perform reliably and are used consistently during police-civilian encounters*	**MetroPD:** (High) Consistent and reliable performance of material components helped officers develop muscle memory (i.e., habit) of activating/deactivating BWC during police-civilian encounters.	"I have the muscle memory down. ... Now what that camera picks up, I don't have control over that. All I know is that I turn it on and it's up here." (*Officer71*) "The camera works great. I turn it on. It goes. It does its thing and I haven't had it screw up at all" (*Officer51*)
	CityPD: (Low) Frequent malfunctions and unreliable performance of material components prevented officers from developing muscle memory (i.e., habit) of activating/deactivating BWC during police-civilian encounters.	"So, I have had some difficulty with a couple of mine. We've kind of had some issues with the particular ones that we've had where they're just, yeah, don't seem to be high quality. My first one was recording all the time and not being turned on. So, that's a concern right? ... So, I've had issues with actually two of them. ... when you have issues you have to send it back and then try to get a replacement." (*Sergeant22*)
	TownPD: (Low) Frequent malfunctions and unreliable performance of material components prevented officers from developing muscle memory (i.e., habit) of activating/deactivating BWC during police-civilian encounters.	"Sometimes they don't work. So there's times when you go to record it, you think it's recording, and then the battery dies, or something happens with it, and that's hard to explain to the public when that's the one piece of video they want to see. I've been in a struggle with somebody before, and the cable that goes to the battery became disconnected. Well, now I don't have any video." *(Sergeant33)*
Legitimization: *The extent to which enactment of police-civilian interactions is based on provisions that promote transparency and mutual accountability*	**MetroPD:** (High) BWC policy specifically encourages officers to notify civilians prior to recording interactions.	"Officers are encouraged to notify the public that the BWC is activated and recording. Under most circumstances, notification has shown to diffuse incidents. However, there may be times that this is impractical or that the notification could diminish lines of communication. Officer discretion should be utilized and generally favor notification over non-notification." (*BWC Policy, Section 119.00 (d)*).
	CityPD: (Low) BWC policy has no stipulation for officers to notify civilians prior to recording interactions.	"I can count on one hand the number of times I've actually been asked hey is that a camera. You know, if they ask, I say yeah it's a camera." (*Officer62*)
	TownPD: (Low) There was no specific BWC policy and the adopted audio/video recorder policy has no stipulation for officers to notify civilians prior to recording interactions.	"So, when I first started wearing this camera here, I got more complaints from the citizens because I wasn't telling them that they were being recorded. There were some people upset about that." (*Officer13*) "For the most part, the public welcomes the fact that we are wearing cameras. I have more people like, wow, you guys are wearing cameras?"

Appendix B

Selected Capacities of Interpersonal Assemblage

Table B1. Selected Capacities of the Police-BWC-Civilian Interpersonal Assemblage

Capacity ***(****Description****)***	**Case site: Exercised?**	**Illustrative data**
Attenuate civilian complaint filings *(Reduction in the number of civilian complaints filed against police officers)*	**MetroPD:** Yes	I haven't seen a traffic complaint in, I'm trying to think, but it's probably been like a month ... and we used to get them all the time for the traffic guys being maybe short, or being rude, or discourteous. (*Lieutenant11*)
	CityPD: Yes	Well, you know one thing that I've noticed in my job is reduction in complaints. We do get fewer complaints over the last two years. (*Sergeant32*)
	TownPD: Yes	And it slows down the problems of people coming in and making complaints that are frivolous. *(Patrol Officer23)*
Accelerate civilian complaint resolution *(Decrease in the amount of time it takes to resolve civilian complaints filed against police officers)*	**MetroPD:** Yes	And of course from my, you know, particular spot here I as I mentioned I review every internal affairs investigation that's conducted by these two agencies in [City] Police Department and the [City] Sheriff Department. And I think that we'll see some greater efficiency in those investigations and in the process of resolving complaints of officer misconduct. ... Video was often very helpful for officers who's been accused of misconduct. And certainly decreased the amount of times those investigations took to conduct. (*Independent Monitor, Interview with BJA*)
	CityPD: Yes	"I mean in the past if somebody made a serious allegation, if it was a case of excessive force or racially profiling allegation, or something along those lines, it would have to be investigated as a class I, the highest level. ... So those types of investigations are very long and they take a lot of work, usually a couple of months on the short end to run a whole class I investigation. ...If, however, it was a false allegation and we can see that right away on the video, what I have done in the past is I call the complainant up and invite them to come in. ... So, I think it is a big time-saver for those serious kinds of complaints." (*Sergeant42*)
	TownPD: Yes	"And you know, since we instituted the body-worn camera system, when I get a complaint, the first thing I ask my cop is, is it recorded? They say yes, I just recorded it. Then go burn me a DVD and we'll look at it together and if it's -- and we always invite the complainant into the building and give them an option. Do you want to review the video with me? And believe it or not, most people say no because they know the video's going to contradict their complaint and so we squash it right there." (*Patrol Sergeant63*)
Civilize officer behavior *(Improvement in police behavior during interactions with civilians)*	**MetroPD:** Yes	"It definitely makes you more conscious of what you're saying and what you're doing and it's kind of a reminder that you need to be professional, you need to say the right things and do the right things. You know, kind of a subconscious reminder that you need to kind of watch your P's and Q's." (*Patrol Officer81*)
	CityPD: No	<Officers could not tell because the cameras did not work as expected>
	TownPD: Yes	"It keeps our cops, in the back of their mind, hey, I need to make sure I'm careful what I say. Make sure everybody stays professional, so that brings you to a new standard, a new, higher level." (*Patrol Sergeant73*)
Civilize civilian behavior (anecdotal)	**MetroPD:** Yes	"I would tell people on traffic stops that they're being audio and video recorded. And I notice quickly that their attitude would change. They become more respectful. They'd be more cooperative. Something about cameras makes people want to act right. And I don't know what that is, (laugh)." (*Patrol Officer101*)

(Police perceptions about improvement in civilian behavior during interactions with police officers)	**CityPD:** No	<Officers could not tell because the cameras did not work as expected>
	TownPD: Yes	"It puts people in check and we let them know from the get go that we are being recorded right now, you know, so I think they tend to be a little more cautious about what they do and say to us, so I think it's been a good impact." (*Patrol Sergeant83*)
Memorialize police-civilian encounters *(Scheduled storage and retrieval of instances of police-civilian encounters)* *Note: At the end of their shift, officers tag and upload videos to a central server for retention.*	**MetroPD:** Yes	"I'll take my camera home and put it in my home dock. It'll upload to the cloud, wherever that is. And then depending on how it's tagged, it'll be retained for 30 days, three years, five years, ten years or indefinite, depending on how it's tagged." (*Patrol Officer111*).
	CityPD: Sometimes[9]	"We have had instances where the cameras weren't downloading. So they [officers] would put them in the dock and then finish up writing their reports and stuff, take it out and plug it in, and for whatever reason the camera wasn't downloading. ... There was one that I had to send to the vendor. I thought they would be able to fix it ... I had asked the vendor, you know, any video that you can recover from this we need to have on the server and they said there wasn't any video. I don't have any way to verify that. The officer said they were recording but I couldn't physically get the camera to download." (*Tech Specialist*)
	TownPD: Sometimes	You know, this past week, I had an officer who had 10 calls for service during her shift. One was a felony call. She docked her system and then she tried to upload it and it wouldn't upload because of issues with the docking station. (*Command Officer*)
Enhanced recollection through playback of videos *(A jolt in memory aiding officers' recollection of past events or interactions when writing reports)*	**MetroPD:** Yes	In a critical incident, officers' recollections aren't 100%. There's a physiological reaction when you get into a critical incident, so may not remember everything you said, everything you did. By being able to review that—the body-worn camera footage—it'll help your recollection to remember that. (*Patrol Officer121*)
	CityPD: No	We can't review our footage out at the jail. So, if we arrest somebody and we write a report there, we can't access our body-worn camera footage there because they don't have ports that we can connect them to and upload the video at the jail computers. So, if we write a report there and then we come back here [to the police station] and we review the video and we see something that we want to add to the report we actually have to do a second report with the additional information. (*Patrol Officer72*)
	TownPD: Partially	If there's a bunch of stuff going on, it gives you the opportunity to sit down, play the video back and say, "Oh, okay, I missed that. I didn't hear her say that, or I didn't hear—I didn't see him do that." So it gives you real time playback, which is very, very useful. *The negative is sometimes they don't always work when you need them to work*. (*Patrol Officer43*, emphasis added)
Visualize evidence for third parties *(Allowing third parties outside the police organization the opportunity to visualize interactions as they happened)*	**MetroPD:** Yes	"It makes testifying easier; because instead of testifying in court to what happened, they can just watch the video. And if there's any clarification that needs to be made, then I'll be subpoenaed to testify.. So, it's made it easier in that aspect where my testimony is not always required." (*Ofc141*)
	CityPD: Partially	It's very helpful in court. You know, it kind of takes the he said/she said out of it because *as long as the camera is on and it's working* and everything, then you can't really dispute that, you know what I mean? (*Patrol Officer82*, emphasis added)
	TownPD: Partially	When a citizen comes in to make a complaint, it's nice to have video to show exactly what happened. And you know, that's morphed also into the district attorney's office wanting to have video, because that becomes evidence as well. (*Patrol Sergeant93*)

[9] This capacity is sometimes exercised when material components function properly. Other times, when material components malfunction, the capacity is not exercised.

Real-time remote reconnaissance *(Accessing a scene remotely for real-time risk assessment and engagement)*	**MetroPD:** Yes	There is one really incredible use for these that I haven't thought about and it's searching buildings. When you come to a corner and you don't want to put your body around the corner, you take the camera off and peer around the corner with your camera. ... You can get your camera to peer. And it keeps it so much safer. (*Patrol Officer151*)
	CityPD: No	<BWCs did not have a viewer and wireless Bluetooth connectivity> "So our particular model of body camera that we are using, it doesn't have that feature." (*Ofc92*)
	TownPD: No	< Viewers only recently became available. Capacity not exercised yet>
Surveillance *(Surreptitious watching of recordings without cause with potential penalties for non-compliance with policy)*	**MetroPD:** No	Per *BWC Policy (Section 119.00.C.7 and 9)* "Reviews of BWC media that determine it was not activated per policy may result in discipline for the involved officer."
	CityPD: Yes	"Supervisors routinely review BWC recordings for evaluation, training, compliance or other work related purposes." (*General Order 240-2.E.4*) "You know, we're required to periodically review the officer's footage with cameras, just kind of go in and randomly select videos." (*Sergeant52*)
	TownPD: Yes	Supervisors are authorized to review relevant recordings [of officers] any time." (*Audio/Video Policy, Section 450.9*)
Capture pre-event video through buffering *(Capturing 30 seconds of recorded video prior to pressing the BWC record button BWC)*	**MetroPD:** Yes	"If you see a car that commits some kind of traffic infraction, we always remind ourselves to turn the camera on at that point, before we even try to pull them over. That way, your cameras running the entire time, and it goes back 30 seconds, so it may even catch the traffic infraction that you pulled them over for." (*Sergeant71*)
	CityPD: No	<BWCs did not have that capacity>
	TownPD: No	<Turned off due to excessive battery drainage> "They don't record continuously. So, they only record the minute, they go active the minute I push the button. There is a feature on them that can go back 30 seconds, but when we turn that feature on, it drains our battery in four hours." (*Patrol Officer53*)