

A Theory of Innovation: Benefit, Harm, and Legal Regimes

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Ford contended that it should not be tried *ex post facto* on a 1977 law for a car built in 1973 involving an accident in 1978. But the judge bought the prosecutor's argument that the charge was not based on the Pinto design fault, but rather on the fact that Ford had permitted the car 'to remain on Indiana highways, knowing full well its defects.' Manufacturers, said the prosecutor, should be 'on notice that if they have a defective product, and know about it, they should do something about it.'¹

I. INTRODUCTION

While much innovation research has contributed to a greater understanding of the economic, social and individual benefits derived from new technologies, there has been little significant discourse about potential harms that can arise from innovation. As the quote above implies, organisations engaging in innovation activities may produce both benefit and harm. Our paper focuses on the under-researched area of innovation harm and, in particular, understanding how an organisation's implicit or explicit choice of innovation models may contribute to harmful outcomes, especially in relation to firm-external constituents.

We intend to widen the discourse about harm by examining management and legal literature to conceptualise an integrated theory of innovation, harm and information. Although our interdisciplinary approach is critical, we do not intend to diminish the positive social and individual progress made possible by innovation. Instead, our aim is to provide a theoretical conceptualisation of processes through which firms innovate

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¹ 'Business: Pinto Ruling', *Time* (12 February 1979), 87.

by deepening knowledge and, thus, raising awareness of the potential negative or harmful consequences of innovation. To do this, we challenge the underlying management assumption that innovation efforts are either purely beneficial or intended to produce only a limited amount of harm as a necessary cost of creating net benefit. Our paper contributes a richer, more nuanced understanding of innovation by delineating six propositions that predict how innovation choices are related to information and the conditions under which firms make decisions that create behaviour paths which ultimately lead to harmful outcomes.² In addition, our research contributes an information-centric typology for innovation models and a detailed explanation of harm.

Considerable research focuses on preventing losses to organisations,³ internal workplace dangers, and negative externalities⁴ typically affecting parties with no direct relationship to the firm. However, few management and innovation scholars have undertaken studies of the impact that firms' innovation activities have on external constituents, especially benefit or harm arising from innovation. These constituents include customers, suppliers, and others who are externally linked to the firm.⁵ Furthermore, the growing body of business ethics literature alludes to harm, but does not model it in the innovation context.⁶ Others such as Campbell support our argument that harm, in particular, has not been adequately addressed by the various management disciplines.⁷

To explicate the relevance and urgency of this problem, we offer a few case illustrations where varied imperatives to innovate resulted in harm. A recent example of an industry-wide systemic harm episode was the global financial markets' collapse. This problem harmed not only consumers of innovative financial instruments (such as sub-prime mortgages), but also a wide swathe of society. Lacking reliable risk assessment

² Joseph F Porac *et al*, 'America's Family Vehicle: Path Creation in the US Minivan Market' in Raghu Garud and Peter Karnøe (eds), *Path Dependence and Creation* (Psychology Press, 2001) 213, 217 (giving evidence that firm actions establish 'paths' or directions that become difficult to change and that lead to predictable outcomes).

³ Mary J Benner and Michael L Tushman, 'Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited' (2003) 28 *Academic Management Review* 238, 243.

⁴ Jennifer W Spencer, 'The Impact of Multinational Enterprise Strategy on Indigenous Enterprises: Horizontal Spillovers and Crowding Out in Developing Countries' (2008) 33 *Academic Management Review* 341, 342.

⁵ Thomas Donaldson and Lee E Preston, 'The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications' (1995) 20 *Academic Management Review* 65, 69 (explaining a generally accepted typology of stakeholder groups common to various organisations).

⁶ John L Campbell, 'Why Would Corporations Behave in Socially Responsible Ways? An Institutional Theory of Corporate Social Responsibility' (2007) 32 *Academic Management Review* 946, 951 (calling direct attention to the conspicuous dearth of research on harm and addressing firm-external harm in the broader context of general management ethics, not innovation); Blake E Ashforth *et al*, 'Re-Viewing Organization Corruption' (2008) 33 *Academic Management Review* 670 (defining corruption and corrupt behaviour in organisations, but not in relation to innovation or harm to customers); Jonathan Pinto, Carrie R Leana and Fritz K Pil, 'Corrupt Organizations or Organizations of Corrupt Individuals? Two Types of Organization-Level Corruption' (2008) 29 *Academic Management Review* 685, 685 (defining the organisation of corrupt individuals, but not in the context of harm and innovation).

⁷ Campbell (n 6) 951.

information from credit-rating agencies, investors also suffered financial losses stemming from their under-informed decisions to invest in subprime mortgage securities.⁸

Decades ago, an infamous case of innovation harm at the firm level dealt with product safety. Ford intentionally hid fuel tank safety concerns during its introduction of the novel Pinto brand subcompact automobile, which it marketed as a fuel-efficient, well-designed and practical economy car. Later investigations revealed that Ford had calculated that it would be economically more advantageous to ignore the engineering flaws and pay ensuing lawsuits for wrongful deaths than to improve the basic Pinto design.⁹ Other case examples of innovation harm exist in areas including genetics,¹⁰ pharmaceuticals,¹¹ information technology,¹² and even in the realm of patent law innovations.¹³ In the airline industry, a recent case involving Air France, Airbus and Thales (a manufacturer of air speed sensors or 'pitot probes') further highlights the contemporary relevance of innovation harm. Both Air France and Airbus knew of risks and problems associated with Thales's speed sensors installed on various Airbus planes, but did not take timely corrective action before the 2009 crash of AF 447 en route to Paris from Rio de Janeiro.¹⁴ Investigators have cited the sensors as a primary contributing factor in the crash.¹⁵

- 8 Yuliya Demyanyk and Otto Van Hemert, 'Understanding the Subprime Mortgage Crisis' (2009) 24(6) *Review of Financial Studies* 1, 33, <http://rfs.oxfordjournals.org/content/early/2009/05/04/rfs.hhp033.full.pdf+html> (explaining how appreciation in housing prices concealed the risk associated with the subprime mortgage loan market).
- 9 'Business: Pinto Ruling', *Time* (12 February 1979), 87; Douglas Birsch, 'Product Safety, Cost Benefit Analysis, and the Ford Pinto Case' in Douglas Birsch and John H Fielder (eds), *The Ford Pinto Case: A Case Study in Applied Ethics, Business, and Technology* (State University of New York Press, 1994) 147.
- 10 Brandon Keim, 'Gene Therapy: Is Death an Acceptable Risk?', *Wired Magazine* (30 August 2007), www.wired.com/medtech/genetics/news/2007/08/gene_therapy (discussing several cases of failed gene therapy attempts resulting in deaths and pointing to conflicts of interest issues of treating physicians or companies funding gene therapy trials).
- 11 Sumit R Majumdar, Elizabeth A Almasi and Randall S Stafford, 'Promoting and Prescribing of Hormone Therapy after Report of Harm by the Women's Health Initiative' (2004) 292 *Journal of the American Medical Association* 1983, 1987 (explaining innovation harm in the pharmaceutical context).
- 12 Mary J Culnan and Cynthia C Williams, 'How Ethics Can Enhance Organizational Privacy: Lessons from the ChoicePoint and TJX Data Breaches' (2009) 33 *Management Information Systems Quarterly* 673, 678 (explaining information harm in the information technology context).
- 13 Jon F Merz *et al*, 'Disease Gene Patenting is a Bad Innovation' (1997) 2 *Molecular Diagnosis* 299 (explaining that the 'legal innovation' of allowing patents for methods for detecting genes associated with diseases creates risks to patients, and impedes the practice of medicine and medical science). See also *Association for Molecular Pathology v USPTO*, 653 F 3d 1329 (2011) (ruling that isolated DNA and cDNA as well as some of the method claims for screening potential cancer therapeutics by tracking changes in cell growth rates are patentable); Brian Zadorozny, 'The Advent of Gene Patenting: Putting the Great Debate in Perspective' (2009) 13 *SMU Science & Technology Law Review* 89 (concluding that the patent system is a necessary evil in order to effectively protect the intellectual property inherent in the genetic engineering process).
- 14 Bureau d'Enquêtes et d'Analyses (BEA), *Final Report on the Accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP operated by Air France flight AF 447 Rio de Janeiro – Paris* (July 2012), 141, www.bea.aero/docspa/2009/f-cp090601.en/pdf/f-cp090601.en.pdf (discussing various instances in which a variety of operators warned Airbus about incidents relating to problematic pitot tubes).
- 15 *Ibid*, 17.

To clarify, our research investigates harm arising from innovation and information asymmetries. Given the diffusion of innovation approaches through normative and mimetic processes like management education, credentialing and professional group memberships,¹⁶ we assume that an ever increasing number of firms are explicitly and deliberately adopting formalised innovation models to bring their creations to market. An example of an innovation model is ‘robust design’ derived from Edison’s introduction of the electric light.¹⁷ Andrew Hargadon and Yellowlees Douglas provide evidence for our argument that information is a crucial mediating variable in the innovation process. They note that, to preserve adaptability for uncertain future market states, ‘prospective innovators must carefully choose designs that couch some features in the familiar, present others as new, and keep still others hidden from view’.¹⁸ We are intrigued by the tension arising from the informational choices put forth by innovation models and diverse pressures for information transparency. Firms that hide certain aspects of an innovation may gain acceptance, but may also create tremendous risks for their customers, for third parties, and for society as a whole. It is this ‘hidden dimension’ or selective creation of information asymmetries that, in the context of organisational creativity and innovation, presents challenges to ethics and may ultimately, in certain circumstances, violate the law.

Of course, the foregoing raises many specific questions. As innovators and managers act on behalf of firms by applying innovation models to increase their innovations’ likelihood of success, *what informational choices and responsibilities do they have?* And perhaps more importantly, *under which circumstances are innovating firms most likely to create harm?*

II. INNOVATION, BENEFIT, HARM, AND INFORMATION LITERATURE

Defining Innovation, Benefit, and Harm

Historically, many authors have defined innovation as a sequential two-part process of idea generation (ie, exploration) and commercialisation (ie, exploitation) of the most promising ideas into useful products or services.¹⁹ A general underlying assumption of

¹⁶ Ruth V Aguilera and Gregory Jackson, ‘The Cross-National Diversity of Corporate Governance: Dimensions and Determinants’ (2003) 28 *Academic Management Review* 447, 458 (explaining how innovation practices have become normative and diffused through institutionalization processes).

¹⁷ Andrew B Hargadon and Yellowlees Douglas, ‘When Innovations Meet Institutions: Edison and the Design of the Electric Light’ (2001) 46 *Administrative Science Quarterly* 476, 479 (defining ‘robust design’ as a legitimised approach to innovation used by Edison).

¹⁸ *Ibid.*, 480.

¹⁹ Edward B Roberts, ‘Managing Invention and Innovation: What We’ve Learned’ (1988) 31 *Research-Technology Management* 11, 12 (defining an invention-exploitation view of technological innovation); Benner

this widely accepted conceptualisation is that innovation consists of positive acts of contextual destruction and construction that result in net benefits or increases in utility for most if not all constituencies.²⁰ An actor's utility refers to a combination of behavioural needs and classical economic functional components.²¹

However, there exists support for our expanded view of innovation that acknowledges information as a mediator and accepts as dependent outcomes not only the benefits, but also the harms experienced by constituents.²² This is especially topical given rising demands for organisations to enact codes of ethics and encourage responsible behaviour.²³ Certain innovation scholars suggest that innovation is an information-driven distributed agency process of changing social institutions and industry structures to permit the acceptance of new market-tradable value or utility.²⁴ Utility takes various forms, including products or services, production processes, organisational structures,

and Tushman (n 3) 239 (defining a process management view of technological innovation); James March, 'Exploration and Exploitation in Organizational Learning' (1991) 2 *Organization Science* 71, 71 (defining an exploration-exploitation view of technological innovation).

²⁰ Joseph Schumpeter, *Capitalism, Socialism, and Democracy* (Harper & Brothers, 2nd edn 1942) 132 (discussing innovation as a process for positive social change).

²¹ Ernst Fehr and Klaus M Schmidt, 'The Economics of Fairness, Reciprocity and Altruism: Experimental Evidence and New Theories' in SC Kolm and J Mercier Ythier (eds), *Handbook on the Economics of Giving, Reciprocity and Altruism* (North Holland, 2006) vol I, 615, 619 (explaining utility functions for individuals); Shmuel I Becher, 'Asymmetric Information in Consumer Contracts: The Challenge That is Yet to Be Met' (2008) 45 *American Business Law Journal* 723, 729 (discussing consumer utility in the context of standard form contracts).

²² Bruno Latour, 'Technology Is Society Made Durable' in John Law (ed), *Sociology of Monsters: Essays on Power, Technology, and Domination* (Routledge, 1991) 103, 130 ('In order to make a diagnosis or a decision about the absurdity, the danger, the amorality, or the unrealism of an innovation, one must first describe the network'); Gerhard Fischer, 'Symmetry of Ignorance, Social Creativity, and Meta-Design' (2000) 13 *Knowledge-Based Systems* 527, 528 ('Complexity in design arises from the need to synthesize different perspectives of a problem, the management of large amounts of information relevant to a design task, and understanding the design decisions that have determined the longterm evolution of a designed artifact'); Hargadon and Douglas (n 17) 478 (explaining the importance of knowledge and information structures, schemas and scripts to the innovation process); Henry Chesbrough, 'The Logic of Open Innovation: Managing Intellectual Property' (2003) 45 *California Management Review* 33, 33 (discussing an information-centric view of innovation); Raghu Garud and Peter Karnøe, 'Bricolage Versus Breakthrough: Distributed and Embedded Agency in Technology Entrepreneurship' (2003) 32 *Research Policy* 277, 289 (delineating case examples that link information, failure as harm, and benefit in an innovation context and noting that, in cases of innovation harm, there was 'little pressure to develop independent mechanisms for information disclosure and evaluation that could have made the market more "transparent" and helped to protect users from poor technology').

²³ Sandra Waddock, 'Building a New Institutional Infrastructure for Corporate Responsibility' (2008) 22 *Academy of Management Perspectives* 87, 88 ('Corporations have come under significant fire in recent years around their (lack of) responsibility').

²⁴ Fischer (n 22) 527 (explaining how innovation and design processes benefit from multi-stakeholder involvement); Hargadon and Douglas (n 17) 492 (illustrating how Edison interacted with the various stakeholders, a 'network of actors', in the innovation process); Garud and Karnøe (n 22) 294 (giving a case example of distributed and embedded innovation).

and institutional structures.²⁵ At the firm level in particular, innovation is the firm-specific information process of producing utility from creative (ie, novel and useful) ideas.²⁶

Given the aforementioned, we have adopted an econometric approach to delineating outcomes, as a continuum, that firm-external constituents experience as a result of firms' innovation decisions and actions. We logically conceive that these activities may partially or fully cause three discrete outcome states, as follows: (1) status quo (no effect); (2) benefit; and (3) harm. While status quo refers to no substantive change in an actor's utility, we define benefit as an increase in an actor's utility such as goods, services, capital, emotional joy, physical well-being, cognitive capacity, and the ability to act in one's own self-interest. In contrast, we generally define harm as a decrease in utility. While the overriding aim of innovation may be to produce benefit, in reality actors and groups who participate in market transactions to gain benefits may also experience harm, which raises interesting ethical and legal issues. Although we are concerned with both benefit and harm, we focus our discussion below on the particulars of harm, since such an understanding is both missing from the innovation literature and necessary for a complete and comprehensive theory of innovation. By deepening our understanding of the origins of harm, we bring balance to an interdisciplinary situation wherein management scholars have long focused almost exclusively on benefit as the singular outcome of innovation activities. Likewise, while legal scholars have addressed the various risks of harm arising from general business activity, they have often done so without fully understanding the particular underlying antecedent managerial factors that systemically predict both innovation harm and benefit.

Mill introduced the 'harm principle' as the sole basis for justifying limited government intervention into citizens' affairs. Mill viewed harm as the direct and obvious conduct of one actor which causes harmful outcomes for another actor. Based on the central notion of 'harm to others',²⁷ Mill's harm principle has provided a normative standard for delimiting institutional codification of an actor's behaviour. One contemporary school of thought focuses on the harm that flows from the collective actions

²⁵ David J Teece, 'Capturing Value from Technological Innovation: Integration, Strategic Partnering, and Licensing Decisions' (1988) 18 *Interfaces* 46, 47 (reviewing various benefits from innovation).

²⁶ Lori A Fidler and J David Johnson, 'Communication and Innovation Implementation' (1984) 9 *Academic Management Review* 704, 705 ('In fact, the various types of power and the communication channels available to transmit influence and information concerning innovations are the primary structural characteristics of organizations that affect the ultimate implementation of an innovation'); Fischer (n 22) 531 ('Collaborative constructions result in work products that are enriched by the multiple perspectives of the participants'); Felix C Brodbeck *et al*, 'Group Decision Making under Conditions of Distributed Knowledge: The Information Asymmetries Model' (2007) 32 *Academic Management Review* 459, 459 (explaining research about organisations that foster group innovation processes, due to unique knowledge distribution among group members, that leads to higher quality and more creative innovations).

²⁷ John Stuart Mill, *On Liberty* (Longman, Roberts & Green, 1859) 22 ('that the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others').

of many actors, even if the actions of a single actor are not directly harmful.²⁸ This group has proposed an *accumulative harm theory* that focuses on actors' behaviours that, only when aggregated, set back or interfere with the interests of other actors. Accumulative harms are those performed by a group collectively when the actions of one group member would not be sufficient alone to cause harm to an actor.²⁹ Proponents of accumulative harm theory distinguish between harmful conduct and harmful outcomes and note that accumulative harm behaviour exists when it causes a harmful outcome for a single actor. Furthermore, these scholars contextualise harmful conduct by expanding the list of directly harmful behaviours to include indirect actions (ie, actions not directly causing detectable harm) if those behaviours are part of a collective number of simultaneous or accumulative acts that yield harm. Air pollution is a classic example of accumulative harm that is highly relevant in light of the burgeoning sustainability movement.³⁰ We find this contemporary view compelling and relevant for innovation since it sensitises us to less obvious, yet powerful, sources of harmful behaviour.

Many legal scholars who have attempted to clearly define harm have highlighted the tremendous complexity of this endeavour.³¹ In particular, Hamish Stewart illustrates

²⁸ Richard A Epstein, *Principles for a Free Society: Reconciling Individual Liberty with Common Good* (Perseus Books, 1998) 71 (noting that harm is the gateway through which disputes enter the legal system and suggesting that the transformation of the harm principle has led to the modern regulatory state). See also Ferdinand Schoeman, 'The Harm Principle and a Theory of Natural Rights' (1977) 11 *Journal of Value Inquiry* 235, 236 (finding the harm principle almost useless unless supplemented with a definition of what is meant by harm and concluding that rather than functioning as the standard for defining the limits of state interference, the harm principle is responsible for the lack of general limits and therefore needs to be supplemented with a theory of rights).

²⁹ Joel Feinberg, 'Environmental Pollution and the Threshold of Harm' (1984) 14 *Hastings Center Report* 27, 29 (explaining how air and water pollution pose threats of accumulative harm); Andrew Kernohan, 'Accumulative Harms and the Interpretation of the Harm Principle' (1993) 19 *Social Theory & Practice* 51, 52 (describing the often public nature of accumulative harms and noting that, while caused by a group, accumulative harms can often 'be serious individual harms' in effect); Andrew Kernohan, 'Individual Acts and Accumulative Consequences' (2000) 97 *Philosophical Studies* 343, 364 ('In dealing with accumulative consequences, we must, I think, give up on trying to impute them to individuals. Instead, we must attempt to promote accumulative benefits or prevent accumulative harms through systems of regulation, incentives and education that are workable and fair, but which do not depend on knowing who did what to whom').

³⁰ Joel Feinberg, *Harm to Others: The Moral Limits of the Criminal Law* (Oxford University Press, 1984) vol 1, 225–32.

³¹ Ernest Nagel, 'The Enforcement of Morals' (May–June 1968) *The Humanist* 20, 27 (concluding that there is no general answer to the question whether certain categories of action should be legally controlled and whether certain standards of conduct should be legally enforced, and suggesting that the question can be resolved only case by case); Schoeman (n 28) 236 (concluding that rather than functioning as the standard for defining the limits of state interference, the harm principle is responsible for the lack of general limits. It therefore needed to be supplemented with a theory of rights. Schoeman uses the criterion of an individual's vulnerability to full social and economic participation to distinguish 'harm' from 'inconvenience'. Consequently, he argues that ultimately 'our consideration of rights rests on the historically varying conditions prerequisite to full participation in a community of persons'); Nina Peršak, *Criminalising Harmful Conduct: The Harm Principle, its Limits and Continental Counterparts* (Springer, 2007) 61 (noting that what is perceived as 'harm' varies not only through space between societies and even within a particular society but also through time and consequently poses the question as to how far one can get by *a priori* defining the essence, the conception or meaning, as opposed to the concept or the understanding, of harm).

the ambiguity of the harm principle by using—among other examples—the financial damage that one business can impose on another in the course of permissible competitive activities in the marketplace. While this constitutes harm to the affected business, it is generally viewed as justified by the presumed benefits to society by permitting competition.³² For example, when Apple built upon an emerging technology path by introducing the iPod digital music player and the complementary iTunes virtual music store, institutionalised market structures for legal music delivery were widely altered.³³ The existing system of music providers, distribution organisations and media, which were already engaged in lawsuits challenging the legality of internet peer-to-peer file-sharing services such as Napster and Grokster, were radically displaced by efficient and economically feasible internet delivery mechanisms such as iTunes.³⁴ Stewart postulates that a legal view of harm must be restricted to violations of an actor's Kantian rights (ie, the juridical rights a person has just by virtue of being a person) and setbacks to legally protected interests.³⁵ Nina Peršak comments on the socially constructed nature of harm and cautions that perceptions of harm vary not only through space, such as between societies, but also across time.³⁶ Harm's temporal and context-contingent nature may limit researchers' and policy-makers' attempts to *a priori* conceptualise or define its essence.

1. Deepening our Understanding: Harm as a Construct

To robustly develop our view of harm (the opposite of benefit in the outcomes continuum), we build upon Joel Feinberg's three senses of harm.³⁷ The first understanding, which he immediately dismisses, is the sense that anything can be harmed. Clarifying that objects are only harmed when they are objects of someone's interest, he describes the second and non-normative sense of harm as a setback or hindrance to an actor's interest. He uses the term 'interest' in the broad sense of an actor's stake in all matters

³² Hamish Stewart, 'The Limits of the Harm Principle' (2010) 4 *Criminal Law and Philosophy* 17, 19 (concluding that the 'harm' in the 'harm principle' must be restricted to those set-backs to interests that the criminal law has a reason to recognise).

³³ Jerald Hughes and Karl Reiner Lang, 'If I Had a Song: The Culture of Digital Community Networks and its Impact on the Music Industry' (2003) 5 *International Journal on Media Management* 180, 183 (discussing the sudden growth of the online music industry and the decline of the record industry).

³⁴ Mark A Lemley and R Anthony Reese, 'Reducing Digital Copyright Infringement Without Restricting Innovation' (2004) 56 *Stanford Law Review* 1345, 1353 (describing the increased value to both users and copyright owners of 'legal, fee-based services that provide many of the desirable features of p2p networks' to deliver music efficiently).

³⁵ Stewart (n 32) 19 ('The first is to provide an account of rights that is independent of the account of harms, that is, an account of the juridical rights that a person has just in virtue of being a person who is subject to the law. For the purposes of this paper, I will call rights of this kind "Kantian rights" to emphasize their close connection with the Kantian conception of the legal person').

³⁶ Peršak (n 31) 31.

³⁷ Feinberg (n 30) 31–36.

that impact that actor's well-being, such as career, a company's success, family matters, civic affairs, and personal goals. Then, he articulates the third and normative sense of harm, which is the understanding of harm as a 'wrong', such as when one person wrongs another by his indefensible, in the sense of unjustifiable and inexcusable, conduct that violates the other's right. Feinberg concludes that only a harm that sets back someone else's interests *and* is wrongful ('wrongful harm') can be rightfully criminalised under the harm principle. Therefore, acts that cause only non-harmful wrongs are not within the harm principle.³⁸

The Restatement of Torts³⁹ uses the word 'harm' to denote the 'existence of loss or detriment in fact of any kind to a person resulting from any cause', and notes that a harm which involves merely personal loss or detriment will only give rise to a cause of action when it results from the invasion of a *legally protected interest*.⁴⁰ In light of the connection between harm and the notion of a 'setback to an interest', it is also important to understand how 'interest' is defined. The Restatement uses the word 'interest' to denote the 'object of any human desire'.⁴¹ When a society views a desire as important enough to make someone who interferes with it civilly or criminally liable, the interest becomes a legally protected interest. There is an ongoing tendency for jurisdictions to recognise interests as worthy of legal protection that previously went unprotected.⁴² Among others, the following interests are commonly viewed as legally protectable interests in the United States as well as in most European legal systems: (1) interests of personality such as the freedom from harmful bodily contact and apprehension thereof, confinement, and emotional distress; (2) interests of property such as the exclusive enjoyment and possession of land and chattels and their good physical condition; (3) interests in reputation, as well as interests in domestic relations such as family solidarity and marital fidelity; and (4) interests in privacy such as absence of physical intrusions into someone's private space and absence of unpermitted disclosure of personal information.⁴³

³⁸ *Ibid*, 35–36 (explaining that '[t]hrough almost all harms in the special narrow sense (wrongs) are also harms in the sense of invasions of interest, not all invasions of interest are wrongs' and therefore 'only setbacks of interests that are wrongs, and wrongs that are setbacks to interest, are to count as harms in the appropriate sense').

³⁹ The Restatement of Torts is a treatise on US tort law published by the American Law Institute, an influential private organisation of legal academics and practitioners striving to articulate governing principles of tort and other areas of the law.

⁴⁰ Restatement (Second) of Torts § 7 (1965).

⁴¹ *Ibid*, § 1.

⁴² *Ibid*, comment e.

⁴³ Feinberg (n 30) 62 ('Inflctions of harm to one's bodily or mental health; diminutions of one's security by the creation of new threats and dangers; reductions of one's liberty of movement through abduction or false imprisonment; depletions of one's material resources through larceny, or robbery, or fraud: all attack one's entire personal well-being, by attacking the welfare interests necessary to it. Our more ulterior interest, which since they include our higher aspirations are in a sense the most important elements of our well-being, are for the most part not directly protectable by the law. If I have an interest in making an important scientific discovery, creating valuable works of art, or other personal achievements, the law will

When legally protected interests collide, courts and legislators typically engage in analyses of the comparative importance of particular interests; this comparison allows them to decide that one interest is socially more worthy of protection than another.⁴⁴ Courts have the ability to define new harms, as illustrated by the *Amy Boyer* case. In this case, the New Hampshire Supreme Court found that information brokers and private investigators can be liable for the harms caused by selling personal information.⁴⁵ The issue was raised in a case of a young woman who was murdered by a stalker who obtained her personal information from an information broker service and its private investigator subcontractor.⁴⁶

In light of our focus on firms' informational conduct, the recent court case of *AT&T, Inc v FCC* also seems noteworthy in this connection. In that case, AT&T argued that corporations, like natural persons, can claim personal privacy interests to qualify for exemptions from disclosure obligations provided for by the Freedom of Information Act. A federal appeals court sided with AT&T, but its decision was recently reversed by the US Supreme Court.⁴⁷ While the US Supreme Court ultimately decided that the informational interests of citizens ought to prevail over the interests of the corporation, the fact that the lower court initially decided in favour of AT&T, recognising a harm to the corporation's privacy interests, also illustrates how state and federal courts have the ability to define new harms.

Some legal scholars have offered criteria for guiding legal decision-makers' analyses of the comparative importance of legally protected interests. Ferdinand Schoeman, for example, lists the following factors:

protect that interest by guarding my welfare interests that are essential to it. But given that I have my life, health, economic adequacy, liberty, and security, there is nothing more that the law (or anyone else, for that matter) can do for me; the rest is entirely up to me. If my highest interest is in pecuniary accumulation as such, or in such uses of wealth as the purchase of a yacht or a dream house, the law can protect that interest indirectly by protecting me from burglary and fraud, but it cannot protect me from bad investment advice, personal imprudence, the unpredictable dependencies of others, the lack of personal diligence or ingenuity, and so on').

⁴⁴ *Ibid*, 35.

⁴⁵ *Remsburg v Docusearch, Inc*, 2002 WL 844403 (DNH 2002), www.courts.state.nh.us/supreme/opinions/2003/remsb017.htm (stating that the risk of criminal misconduct is sufficiently foreseeable so that an investigator has a duty to exercise reasonable care in disclosing a third person's personal information to a client, especially when the investigator does not know the client or the client's purpose in seeking the information. After Boyer's murder, New Hampshire Senator Judd Gregg introduced 'Amy Boyer's Law', which would limit the disclosure of Social Security numbers. The legislation was eventually attacked by both industry groups and by privacy advocates who said it did not go far enough, and ultimately it did not pass). See also Declan McCullagh and Robert Lemos, "Perfect Storm" for New Privacy Laws?, Cnet News (1 March 2005), http://news.cnet.com/Perfect-storm-for-new-privacy-laws---page-2/2100-1029_3-5593225-2.html?tag=mncol.

⁴⁶ The information broker and its subcontractor called Boyer or her mother using a technique called 'pretexting' to find out her work address.

⁴⁷ *AT&T, Inc v FCC*, 582 F 3d 490, 496 (3rd Cir 2009), *revd sub nom, FCC v AT&T, Inc*, 131 S Ct 1177 (2011).

(1) [N]umber of people affected adversely; (2) extent or seriousness of the adversity imposed; (3) likely frequency of acts of the kind in question; (4) desirability of a community's expectation of amenities; (5) types of important activities that may be hampered through regulating the acts in question; (6) effectiveness of laws as tools for regulating the type of behavior under consideration; (7) ability to avoid the harm or offense were the act permitted; (8) possible important use of offensive behavior as a means of drawing public attention to issues or feelings otherwise doomed to obscurity; and (9) emerging needs people acquire.⁴⁸

Andrew von Hirsch and Nils Jareborg rank harms by identifying the following generic utility dimensions of an actor that harmful behaviour may intrude upon: physical integrity, material support and amenity, freedom from humiliation, and privacy/autonomy.⁴⁹ They also use a metric they call the 'living standard' to define harmful outcomes by four socially relative degrees. These degrees comprise: (1) 'subsistence', referring to simple survival, but with maintenance of no more than elementary human capacities to function; (2) 'minimal well-being', defined as maintenance of a minimal level of comfort and well-being or dignity; (3) 'adequate well-being', defined as maintenance of an 'adequate' level of comfort and well-being or dignity; and (4) 'enhanced well-being', defined as significant enhancement in quality of life above the mere 'adequate' level.⁵⁰

2. Our Definition of Harm

We propose that harm consists of two components: (a) *harmful behaviours* and (b) *harmful outcomes*. We define a harmful outcome as a reduction in an actor's utility, including the physical, psychological and economic interests that are often, but not necessarily, legally protected. Furthermore, we identify harmful behaviour as any action by an actor or accumulatively by a group that infringes upon the legally protected interests of another actor. We have adopted the list of legally protected interests as a means for arriving at a standardised utility for actors. To evaluate the degree of harmful outcome,

⁴⁸ Schoeman (n 28) 241–2 ('Though I do not think that it would make sense to try to quantify these factors, assessing the importance of these can be managed qualitatively without necessarily being arbitrary. Regarding these factors as relevant to determining the legitimacy or illegitimacy of a particular class of facts does presuppose a willingness to consider the behavior in question as within the legitimate province of legislation. If some domain of human activity is described as "not the law's business" it will be because more harm results from its proscription than from its tolerance when assessed through some standard like the one outlined above. In saying this I am not to be taken as denying that people have rights but only insisting that certain factors are germane to the consideration of whether something qualifies as deserving').

⁴⁹ Andrew von Hirsch and Nils Jareborg, 'Gauging Criminal Harm: A Living-Standard Analysis' (1991) 11 *Oxford Journal of Legal Studies* 1, 19.

⁵⁰ *Ibid*, 17 (in the second version of the article, the fourth living standard level was termed 'standard wellbeing', which represented the maintenance of full life quality); Andrew von Hirsch and Nils Jareborg, 'Gauging Crime Seriousness: A "Living Standard" Conception of Criminal Harm' in Andrew Ashworth and Andrew von Hirsch (eds), *Proportionate Sentencing: Exploring the Principles* (Oxford University Press, 2005) 202.

we consider von Hirsch and Jareborg’s ‘living standard’ useful.⁵¹ Given that the pursuit of legally protected interests is not possible without an actor’s access to useful information for decision making, information is central to preventing harm. Thus any setback to information accessibility is, in effect, a setback to interests. See Figure 1 below for our conceptualisation of harm and benefit.

In the context of organisations and innovation, we focus on an important type of harm: harm experienced by external constituencies when their engagement with the innovation yields setbacks to the constituency’s legally protected interests. Specifically, we differentiate between a firm’s strategic decisions regarding informational behaviour (eg, to engage or not engage in disclosure acts with constituents) and the implementation effectiveness of the intended information acts. For example, a decision not to share information could be undermined in implementation due to ‘leaks’ or unanticipated exogenous events. Implementation failures would affect the probable emerging harm path by introducing more variability. As we discuss below, evidence suggests that innovator-induced information asymmetries create a greater likelihood of harmful outcomes.

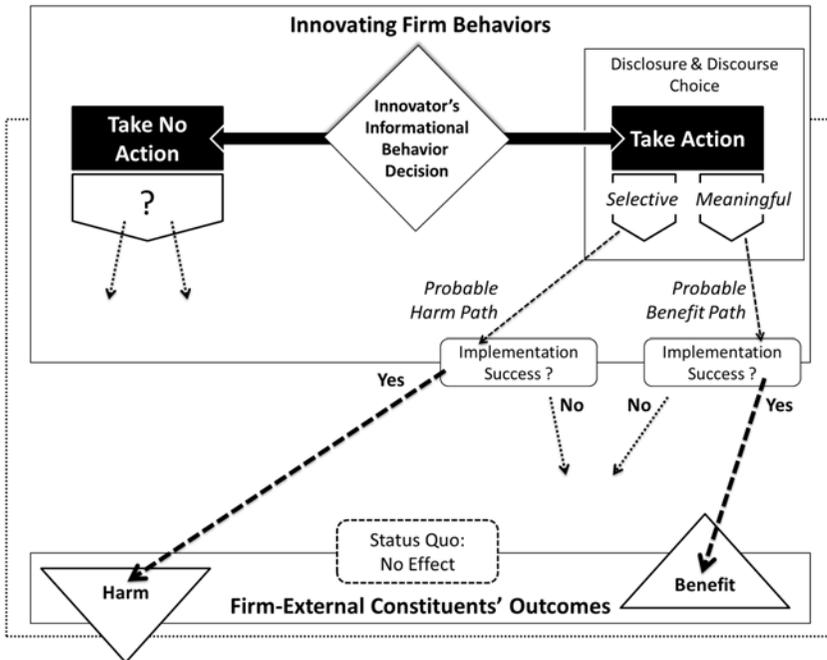


Figure 1: Conceptualisation of Firm-External Harm (and Benefit)

⁵¹ von Hirsch and Jareborg, *ibid.*

III. A THEORY OF INNOVATION, BENEFIT, HARM, AND INFORMATION

Information Asymmetries as Sources of Harm

Based on the theoretical underpinnings discussed above, we have constructed a theory of innovation, benefit, and harm (see Figure 2) with propositions that describe the conditions under which firms are most likely to engage in innovation and information activities that lead to harmful outcomes for external constituents. In the social sciences, theories are developed for gaining insight into causality. Independent or antecedent variables are those conditions, known from other research, that are proposed to cause certain outcomes identified as dependent variables. In particular, we are concerned with firms and their selection and application of innovation models, their internal managerial understandings of ethics and change, and their institutional contexts. We argue that these managerial cognitions, behaviours and contextual conditions are antecedent variables that predict dependent innovation outcomes: either benefit or harm to external constituents. To clarify, we view our dependent variable, firm-external constituents' outcomes as a continuous (rather than dichotomous) measure that is defined by two endpoints: maximum harm and benefit.

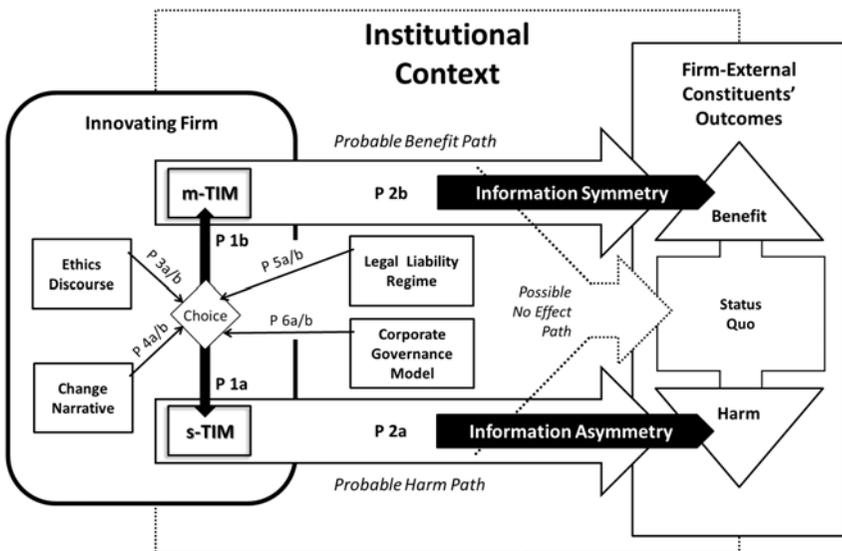


Figure 2: Conceptual Framework: Meaningful Innovation, Harm, and Information

Various management scholars agree that information is an essential input for and output from organisational creativity and innovation processes.⁵² Information becomes asymmetrical when the seller in a transaction has more information than the buyer, thus creating an imbalance.⁵³ George Akerlof describes a type of harm, market failure, which arises from imperfect information.⁵⁴ Shmuel Becher provides compelling evidence that prevalent ‘standard form contracts’ (SFCs) often create information asymmetries that reduce consumers’ maximisation of utility.⁵⁵ Currently, legal discourse about the nature of information is emerging. This debate reveals the difficulty of regulating information disclosure and centres on two competing conceptions: the *quantized view* and what we term the *holistic view*. Proponents of the holistic view argue that the interwoven nature of information pieces makes it difficult for the regulation of some pieces not to have unintended consequences for other pieces of information.⁵⁶ Conversely, the quantized view

⁵² Simon Rodan and Charles Galunic, ‘More Than Network Structure: How Knowledge Heterogeneity Influences Managerial Performance and Innovativeness’ (2004) 25 *Strategic Management Journal* 541, 542 (‘In recent years the role of knowledge and its exchange has emerged as an important area of inquiry in our understanding of innovation and value creation in the firm’); Hüseyin Tanriverdi and N Venkatraman, ‘Knowledge Relatedness and the Performance of Multibusiness Firms’ (2005) 26 *Strategic Management Journal* 97, 115 (giving empirical evidence that informational or ‘knowledge’ synergies are sources of firm-level innovation); N Anand, Heidi K Gardner and Timothy Morris, ‘Knowledge-Based Innovation: Emergence and Embedding of New Practice Areas in Management Consulting Firms’ (2007) 50 *Academic Management Journal* 406, 407 (‘The theoretical motivation of this article therefore was to provide a more complete account of how innovative knowledge-based structures emerge and become embedded in organizations’); Glenn Hoetker and Rajshree Agarwal, ‘Death Hurts, But It Isn’t Fatal: The Postexit Diffusion of Knowledge Created by Innovative Companies’ (2007) 50 *Academic Management Journal* 446, 462 (giving empirical evidence that knowledge created and externalised by exiting firms has social value in the form of innovation by other firms).

⁵³ George A Akerlof, ‘The Market for “Lemons”: Quality Uncertainty and the Market Mechanism’ (1970) 84 *Quarterly Journal of Economics* 488, 489 (describing how harm arises from information asymmetries). See also Richard Craswell, ‘Taking Information Seriously: Misrepresentation and Nondisclosure in Contract Law and Elsewhere’ (2006) 92 *Virginia Law Review* 565, 575 (noting that ‘it is sometimes said—though rarely seriously believed—that the law should require “full” disclosure. The reason such statements cannot be taken literally is that truly full disclosure will usually be impossible. Even for the simplest contracts, there is generally far more information that might be disclosed than it would ever be possible to communicate’); Becher (n 21) (focusing on information asymmetries in the context of consumer standard form contracts (SFCs)).

⁵⁴ Akerlof (n 53) 492 (giving examples of harm arising from information asymmetries).

⁵⁵ Becher (n 21) 732 (‘Indeed, empirical evidence shows that most consumers do not read SFCs. Instead of reading, consumers tend to rely on the drafter’s representation and reputation and to focus their attention on a few limited aspects of the transaction. If consumers do not read contracts to which they adhere, it is doubtful that they maximize their utility by entering them’).

⁵⁶ Ian Ayres and Gregory Klass, *Insincere Promises: The Law of Misrepresented Intent* (Yale University Press, 2005) 88 (discussing the potential chilling effect of promissory fraud liability); Craswell (n 53) 572–3 (in referring to Ayres and Klass’s work the author notes: ‘Significantly, then, Ayres and Klass implicitly reject what I am calling the “quantized” view of information by recognizing that any single bit or speech act (in this case, the promise) can do more than one thing. As a consequence, they also recognize that it may not be possible to get rid of some misrepresentations without getting rid of some useful speech as well. That is, if a promise [in a contract] by itself conveys a false impression, then eliminating the false impression might require eliminating the promise itself. To be sure, in cases where the promisor has absolutely no intention

reduces information to particles that contain only one assertion. Evaluators can then judge each assertion to determine whether it is true or false. Richard Craswell argues that the quantized view attempts to reduce disclosure to a simple binary or an all-or-nothing process of evaluating information particles.⁵⁷ Craswell and others point to disclosure effectiveness issues, noting that the ‘nondisclosure issue often turns on questions about how much disclosure is adequate, rather than on a binary choice between full disclosure and nondisclosure’.⁵⁸

Primarily in response to problems arising from information asymmetries, legislators around the world have developed a variety of regulatory approval systems or safety regimes, such as the Food and Drug Administration in the United States, that require pre-market testing for certain categories of new products because of the products’ inherent dangers. Globally, lawmakers and regulators increasingly find themselves under pressure to apply the ‘precautionary principle’ as a means for developing preventive measures against new potential threats. The principle was enshrined in the Treaty on European Union and now serves as the basis for European environmental, health and other regulations.⁵⁹ Heated legal debate surrounds this principle, with some critics arguing that ‘precautionary’ decisions are a form of trade protectionism.⁶⁰ Smyth *et al* suggest that the application of the precautionary principle ends the commercialisation of any innovation that is incapable of proving absolute safety beyond a reasonable doubt. According to the authors, government regulations or legislation designed to prevent marketplace liabilities may act as a barrier to commercialising innovative products. This, they argue, is evidenced within the member nations of the European Union, where liability has been incorporated into the ‘risk analysis framework’ (RAF) under the auspices of the precautionary principle. Analysing transatlantic differences in agricultural biotechnology regulation, they argue that the present risk analysis framework should be

of performing the promise, getting rid of an insincere promise may be no great loss. In other cases, however, discouraging promises could have costs as well as benefits, and Ayres and Klass are properly sensitive to those costs’).

⁵⁷ Craswell (n 53) 573–4 (‘And it is precisely at this point—when the details of legal rules are being worked out—that the quantized view of information ceases to be useful. When one is trying to decide precisely what ought to be disclosed and how, it is no longer helpful to speak of an abstract particle of information such as “the probability of performance.” At that point, we need a more finely grained analysis of the material to be disclosed, including the precise form in which a disclosure might be made. Only by understanding these applied or practical issues can we fully understand when liability for misrepresentation or nondisclosure might be justified’).

⁵⁸ *Ibid*, 570. See also Becher (n 21) 756–8 (‘First, such duties cannot provide an inclusive remedy. Thus, imposing information disclosure is not an apt solution where consumers do not read SFCs. Moreover, disclosures might be inefficient and might not be tailored to human ability to process information’).

⁵⁹ Treaty on European Union, July 29, 1992 OJ C191, Art 131r/1.

⁶⁰ Marc Victor, ‘Precaution or Protectionism? The Precautionary Principle, Genetically Modified Organisms, and Allowing Unfounded Fear to Undermine Free Trade’ (2001) 14 *Transnational Law* 295, 321 (‘The adoption of the “precautionary principle” is an overreaction to the public’s resistance to GMOs, which is a result of the public’s distrust of science and governmental regulation’).

replaced by a new ‘liability analysis framework’ (LAF) paradigm.⁶¹ However, the LAF as proposed does not fully explore the antecedent conditions that predict when firms and managers might make decisions that enhance firm welfare potentially at the expense of broader segments of society.

Critics of safety regimes frequently argue that regulation is a disincentive for firms to invest in new product development activities,⁶² or that regulators are subject to capture by industry interests.⁶³ Others disagree and note that, for example, drug regulation and innovation are not necessarily at odds with one another because the regulatory framework also provides a valuable service in the form of product quality testing. Firm discourse with government certification agencies may actually encourage beneficial innovation.⁶⁴

In addition to regulatory pre-market testing regimes, lawmakers around the world have developed numerous mandatory transparency regimes aimed at providing consumers with information (such as drug and nutritional labelling) that can help reduce different risks inherent to imperfect information markets.⁶⁵ In the United States, general

61 Stuart J Smyth *et al*, *Innovation and Liability in Biotechnology: Transnational and Comparative Perspectives* (Edward Elgar, 2010) 14 (‘The liability analysis framework that has been developed and defined varies substantially from existing risk analysis frameworks. The key difference between the two frameworks is that those utilizing a RAF are seeking to identify potential health problems or safety concerns and then develop strategies to minimize any potential. On the other hand, those utilising LAF confront a market failure that is realistic with damage that is either evident or a greatly increased potential for damage. A second, but important difference is that all RAFs are based on science with no ability for society to become involved whereas LAFs are grounded in governance and legal principles. As a result, society has the ability to use those principles to prohibit or frustrate innovation. Finally, those involved with a RAF are able to quantify the variables of the situation. It may be that the variables are expressed within a range of possibilities, but as long as the range is within the accepted boundaries it does not offer a risk concern. Stakeholders involved with a LAF will have some variables quantified, but at the same time, other variables will be completely unknown (for example, role of the media, degree of outrage). Ultimate, the RAF is a tool that is used to predict potential concerns and can be focused narrowly in its application. On the other hand, the LAF is considerably broader in scope and deals with containment of market failure’).

62 Henry G Grabowski and John M Vernon, *The Regulation of Pharmaceuticals: Balancing the Benefits and Risks* (AEI Press, 1983) 9 (‘The benefits of government regulation in this and other areas are not costless. The most significant cost of more stringent regulatory controls over introduction of new pharmaceuticals is a slower rate of pharmaceutical innovation’); Patricia M Danzon, ‘The Pharmaceutical Industry’ in *Encyclopedia of Law and Economics* vol 3, *The Regulation of Contracts* (Edward Elgar, 2000) 1055, 1058–61.

63 Daniel P Carpenter, ‘Protection Without Capture: Product Approval by a Political Responsive, Learning Regulator’ (2004) 98 *American Political Science Review* 613, 626–7 (discussing whether capture can account for firm dominance in any given industry); Amitai Etzioni, ‘The Capture Theory of Regulations—Revisited’ (2009) 46 *Society* 319, 323 (arguing for more capture-resistant regulations).

64 Garud and Karnøe (n 22) 280 (explaining the value of institutional testing agencies); Ariel Katz, ‘Pharmaceutical Lemons: Innovation and Regulation in the Drug Industry’ (2007) 14 *Michigan Telecommunications & Technology Law Review* 1, 8 (describing the drug regulatory framework as a ‘valuable service’ of drug quality certification).

65 David Weil *et al*, ‘The Effectiveness of Regulatory Disclosure Policies’ (2006) 25 *Journal of Policy Analysis & Management* 155, 156 (describing the vast array of national and international disclosure systems and evaluating their ability to correct information asymmetries).

tort and contract law, as well as products liability law, are most relevant for gaining an understanding of the methods by which the law mandates and incentivises information sharing in markets. General tort law incentivises disclosure by shielding innovators, who attach adequate warnings about potential dangers to their products, from liability for harms resulting from those potential dangers. Product liability law also governs innovators' informational choices. The purpose of product liability law is to hold manufacturers, distributors, retailers and others who make products available to the public, responsible for the injuries caused by those products. Product liability law generally draws on principles of negligence, strict liability and breach of warranty law,⁶⁶ and applies different standards of liability to manufacturing defects, design defects, and defects based on inadequate instructions or warnings.

Innovation Models

At the firm level, actors and groups increasingly adopt forms of innovation strategies, managerial practices, techniques or useful processes to achieve successful innovation.⁶⁷ We refer to any formalised (written) schemata, approach, theory, strategy or paradigm of innovation as an 'innovation model'. These models help innovators to develop mental constructs that shape and guide their cognitive processes and behaviours. At the firm level, innovation models contribute to a distinct language that managers may use to guide the firm-specific change and innovation processes described above. Models may have implicit and explicit components and are usually predictive or prescriptive.

We are interested in gaining a richer understanding of the differences and similarities among various models, especially distinctions that may govern information transmission and power-sharing between constituents. We reviewed existing literature in search of typologies and found only one comprehensive approach and two other conceptual approaches. Shona Brown and Kathleen Eisenhardt propose a three-part typology of new product innovation perspectives: rational plan (RP), communications web (CW), and problem-solving process (PSP).⁶⁸ The various models and literature reviewed have dependent variables that are firm-centric, such as greater financial performance or more

⁶⁶ Restatement (Third) of Torts: Products Liability, § 1 cmt a (1998).

⁶⁷ Fidler and Johnson (n 26) 706 (explaining the relationship between communication and innovation in firms); Shona L Brown and Kathleen M Eisenhardt, 'Product Development: Past Research, Present Findings, and Future Directions' (1995) 20 *Academic Management Review* 343 (explaining product development as an innovation process); Ikujiro Nonaka and Hirotaka Takeuchi, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (Oxford University Press, 1995) (explaining organisational and team learning via the process of transforming tacit knowledge to explicit knowledge); Hoetker and Agarwal (n 52) 447 (explaining diffusion as a process of interfirm knowledge transfer); Anand (n 52) 415 (explaining 'emergence' and 'embedding' as process steps for innovation); Esteve Almirall and Ramon Casadesus-Masanell, 'Open Versus Closed Innovation: A Model of Discovery and Divergence' (2010) 35 *Academic Management Review* 27 (explaining open and closed innovation approaches).

⁶⁸ Brown and Eisenhardt (n 67) 345.

efficient internal processes. Both the CW and the PSP perspectives are supported by research that links firm communication with external parties to firm success. While Brown and Eisenhardt, through the CW and PSP streams, propose strong firm incentives for information exchange, knowledge development and network links, the authors neglect to discuss any duties and responsibilities to prevent harms that might result when firms decide to limit information disclosure or restrict dialogue with external constituents during innovation activities.⁶⁹

Chesbrough proposes a two-type conceptual view that organises models as either ‘closed’ or ‘open’.⁷⁰ He gives compelling firm-centric arguments for open innovation (including emergent open forms such as ‘open sourcing’, ‘crowd sourcing’, ‘community innovation’, etc), in which firms willingly share information (ie, engage in transparency and power-sharing) from the firm’s intellectual property while concentrating on the development of effective business models.⁷¹ Although he suggests benefits for firms that engage in open innovation, his categorisation scheme does not explicitly address any relationships between information sharing and harm.

In their innovation policy paper, Garud and Karnøe informally suggest a two-part intuitive classification system that focuses on two fundamentally different innovation approaches: *bricolage* and *breakthrough*.⁷² Breakthrough typically controls and limits involvement to firm-internal actors, whereas bricolage distributes innovation agency to firm-external parties.⁷³ While their view implicitly assumes that information transparency and power-sharing are necessary to engage firm-external actors, they do not explicitly discuss harm or information disclosure in the context of power-sharing as a core defining feature.

Meaningful Transparency and Selective Transparency Innovation Models

Building upon Garud and Karnøe, we delineate a typology centred on the treatment of *information transmission*. We have reviewed a variety of innovation models with the aim of finding evidence of transparency and power-sharing. Each model has been popularised through theoretical and empirical research literature and provides internally consistent guidance for change and innovation activities. We have included innovation models selected from a range of literature since they provide useful predictions, prescriptions, mechanisms and processes that guide firms’ innovation activities.

In total, our convenience sample consists of 28 models or classes of like models that appeared in top journals and other publications over the past few decades. We analysed each model with the aim of determining whether the model explicitly or implicitly

⁶⁹ *Ibid*, 374.

⁷⁰ Chesbrough (n 22) 35.

⁷¹ *Ibid*, 38.

⁷² Garud and Karnøe (n 22) 294.

⁷³ *Ibid*, 296.

prescribed or predicted communication, information transparency and power sharing between internal and external constituents.⁷⁴ We are interested in the deeper conditions that would enable transparency and disclosure as previously defined. Therefore, we posit that firm power-sharing with external constituencies is a key variable by which many of these models may be distinguished and ordered. In response, we thematically grouped these widely accepted models in relation to their predicted or prescribed mode of discourse development. In particular, we are concerned with the degree to which these models encourage power-sharing among a firm and its various external constituencies during acts of innovation.⁷⁵ We hypothesise that information and power-sharing are highly correlated constructs since information gives actors the power to pursue their interests. With high degrees of power-sharing, we argue that firms and constituencies deliberately enter into dialogues with the aim of co-developing a collective language and meanings for benefit and harm that might flow from acts of innovation. This approach overcomes the problematic nature of information perfection previously discussed.⁷⁶ Under conditions of low power-sharing, firms may act unilaterally without sufficient development of shared meaning, thus increasing the likelihood of producing harm. This is consistent with scholarship that highlights the integrated nature of discourse and power.⁷⁷ For example, Coleman and Voronov describe their ‘critical-postmodern discursive framework of organizational power’ (CFOP), and conclude that power sharing yields higher benefit outcomes.⁷⁸ We argue that high transparency and power-sharing are encouraged when a particular model, as described by its authors, prescribes or predicts high levels of innovation involvement from the firm and its external constituents.⁷⁹

⁷⁴ Bruce L Berg, *Qualitative Research Methods for the Social Sciences* (Pearson, 2009). We used a content analysis approach in which each author conducted interpretive readings of each model text, then recorded overall impressions. Please contact the authors for a complete list of the models: rvogl@law.stanford.edu; robert@robertedgell.com.

⁷⁵ Fidler and Johnson (n 26) 706 (explaining the relationship between power and innovation).

⁷⁶ Craswell (n 53) 578; Becher (n 21) 734 (‘The existence of obligational asymmetric information is a serious market failure that can undermine the efficiency of many consumer transactions. Contracts will systematically increase welfare if, and only if, contracting parties have the information necessary for an informed evaluation of all transactional aspects (including, of course, contract terms). Stated slightly differently, information inequalities belie the maxim that promisees (ie, consumers) are the best judges of their own utility. Where imperfect information exists, the ability of parties to maximize utility via open market transactions will inevitably decrease’).

⁷⁷ Peter Thomas Coleman and Maxim Voronov, ‘Power in Groups and Organizations’ in Michael A West, Dean Tjosvold and Ken G Smith (eds), *International Handbook of Organizational Teamwork and Cooperative Working* (Wiley, 2003) 229, 242 (discussing power and discourse in organisations); Gail T Fairhurst and Linda Putnam, ‘Organizations as Discursive Constructions’ (2004) 14 *Communication Theory* 5, 7 (explaining discourse analysis as a lens to understanding organisations); Steffen R Giessner and Thomas W Schubert, ‘High in the Hierarchy: How Vertical Location and Judgments of Leaders’ Power are Interrelated’ (2007) 104 *Organizational Behavior and Human Decision Processes* 30, 31 (explaining ‘social embodiment perspective’ or the relationships among leadership, power and vertical location in organisations).

⁷⁸ Coleman and Voronov (n 77) 239.

⁷⁹ For an analysis of default rules in contracts and information asymmetries between contracting parties, see Ian Ayres and Robert Gertner, ‘Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules’ (1989) 99 *Yale Law Journal* 87 (showing that when one party to a contract has more information than

Our review indicates that transparency coupled with power-sharing could be used to discriminate between models. In response, we propose a primary classification system with two categories labelled as either *meaningful* (*m*) or *selective* (*s*) transparency. Although our proposed typology is broad, it is by no means exhaustive and definitive. Rather, we have endeavoured to create a system that is illustrative and useful for further developing our theoretical propositions.

Meaningful Transparency Innovation Models (m-TIMs) are those that encourage innovating firms and others to share information and power among a diverse group of constituencies, especially those stakeholders who may contribute to the innovation process or who will likely be impacted (ie, experience harm or benefit) from the eventual innovation. These models persuade innovating firms to engage in broad discourse with embedded stakeholder groups to develop shared meanings, often with the aim of heightened technological and social integration.⁸⁰ Our archetypical m-TIMs include ‘bricolage’,⁸¹ ‘open innovation’ (eg, open sourcing, crowd sourcing, community innovation, etc)⁸² and ‘meta-design’.⁸³ For example, Fischer’s model emphasises that ‘[m]eta-design characterizes activities, processes, and objectives to create new media and environments that allow users to act as designers and be creative. This can be compared with the objective in art that focuses on the artist as the facilitator of the creative experience for users.’⁸⁴

In contrast, *Selective Transparency Innovation Models (s-TIMs)* are those that call for firms to maintain strong firm-centric power and information control, often on the basis of competitiveness arguments. Furthermore, these models may guide firms to influence the perception of value through the careful and selective distribution of information and a firm-favourable development of knowledge and meanings. These models persuade innovating firms to limit and prioritise discourse with the various stakeholder groups by withholding (eg, ‘hiding’) select information about the technology and social impacts. Guided by s-TIMs, firms attempt to manage stakeholders’ perceptions of value, often with the aim of manoeuvring stakeholders’ willingness to accept and eventually adopt the innovation while preserving adaptability for future uncertainties. Our archetypical s-TIMs include ‘breakthrough’⁸⁵ and ‘robust design’.⁸⁶ As noted previously, Hargadon

the other, the knowledgeable party may strategically decide not to contract around an inefficient default rule in a contract in order to withhold information for its advantage, and concluding that lawmakers may be able to counteract the incentives for this kind of strategic incompleteness by establishing penalty defaults that encourage the better informed parties to reveal their information by contracting around the default rule).

⁸⁰ Latour (n 22) 111 (explaining the integration of social and technological theories as a foundation for actor network theory).

⁸¹ Garud and Karnøe (n 22) 284.

⁸² Chesbrough (n 22) 35.

⁸³ Fischer (n 22) 531.

⁸⁴ *Ibid*, 529.

⁸⁵ Garud and Karnøe (n 22) 284.

⁸⁶ Hargadon and Douglas (n 17) 479.

and Douglas convincingly argue that ‘prospective innovators must carefully choose designs that couch some features in the familiar, present others as new, and keep still others hidden from view’.⁸⁷

Proposed Outcomes Based on the Adoption of a Particular Innovation Model

We propose that the selection of a particular type of innovation model is a crucial first step in path creation that may probabilistically lead to either harmful or beneficial outcomes.⁸⁸ Based on the above, we propose our first set of propositions as follows:

Proposition 1a: *Firms that adopt s-TIMS are more likely to create information asymmetries for constituents.*

Proposition 1b: *Firms that adopt m-TIMS are more likely to create information symmetries for constituents.*

Furthermore, based on the considerable evidence⁸⁹ and legal arguments presented herein, we posit that creating information asymmetries increases the likelihood of harm. Therefore, we propose the following:

Proposition 2a: *Firms that create information asymmetries during the innovation process are more likely to induce harm for constituents and society.*

Proposition 2b: *Firms that create information symmetries during the innovation process are more likely to induce benefits for constituents and society.*

However, these propositions then raise the question, *why would firms adopt one type of innovation model over another?* We posit that this decision is driven by the interplay of factors found in firms’ external institutional and internal management contexts. While a coercive pressure such as severe economic conditions may dictate a firm’s direction, thereby usurping management choice, we assume that most firms operate under feasible pressures (eg, non-severe economic conditions). Managers exercise decision-making within the exogenous limits and incentive schemes placed on them by their firm’s external context and their interpretations of economic information. Our next four propositions give insight into these internal and external conditions that we posit influence the selection of innovation model types.

⁸⁷ *Ibid*, 480.

⁸⁸ Porac *et al* (n 2) 226 (discussing conceptual transformations in producer and consumer understandings that lead to ‘unrecognized needs’ or ‘unwanted products’).

⁸⁹ Akerlof (n 53) 489 (‘An asymmetry in available information has developed: for the sellers now have more knowledge about the quality of a car than the buyers’); Becher (n 21) 774 (‘The problem of asymmetric information in consumer contracts is a serious challenge to efficient contracting. Notwithstanding decades of controversy, this challenge is yet to be met’).

1. *The Internal Management Context: Management Discourses and Narratives*

Analysis of a firm's discourses, collections of recorded communications, and narratives such as stories that emerge from discourses, reveal assumptions that underlie top management perceptions of both the external and internal environments.⁹⁰ These perceptions reflect how management makes sense of data about the organisation,⁹¹ which becomes the basis for strategic decision-making that contributes to path creation.⁹² While performance data (such as sales and profits relative to rivals, relative market share, etc) is useful, insight into the sense-making mindset of management may reveal how the team intends to strategically respond to various pressures for change and innovation.⁹³ We have identified two critical internal variables that, we posit, moderate management's choice of innovation models: ethics discourse and change narrative.

1.1 *Ethics Discourse and Propositions 3a and 3b*

Ethics discourse describes the degree to which management adheres to a particular type of philosophy that aids in sense-making of the interconnectedness between economic activity and ethics. The 'separation thesis' describes a rationale for distinguishing between business matters and ethical concerns.⁹⁴ Under a strict application of the separation thesis, ethical concerns could be devalued and assigned secondary consideration relative to business and economic matters. In contrast, the 'entanglement' view suggests that business facts and ethical concerns are interwoven and, as such, cannot conveniently be separated.⁹⁵ Business decisions and ethical matters are interdependent and, as such,

⁹⁰ Ken Starkey and Andrew Crane, 'Toward Green Narrative: Management and the Evolutionary Epic' (2003) 28 *Academic Management Review* 220, 229 ('Stories ... are important frames of reference for managers'); Nelson Phillips, Thomas B Lawrence and Cynthia Hardy, 'Discourse and Institutions' (2004) 29 *Academic Management Review* 635, 637 (explaining 'a discursive model of institutionalization'); Steve Maguire and Cynthia Hardy, 'Discourse and Deinstitutionalization: The Decline of DDT' (2009) 52 *Academic Management Journal* 148, 151 (discussing how discourse is modified by new texts).

⁹¹ Karl E Weick, *Sensemaking in Organizations: Foundations for Organizations Science* (Sage, 1995) 51.

⁹² Porac (n 2) 215 ('Attribute abstraction occurs through conversations and narratives across producers and consumers').

⁹³ Weick (n 91) 71; Starkey and Crane (n 90) 230.

⁹⁴ Starkey and Crane (n 90) 230 ('Here the strategic narrative of competitive advantage through innovation was fulfilled, while the team was also able to make meaning of its achievements in terms of a very old life-sustaining narrative: that of parenthood and parental responsibility to future generations'); Andreas Georg Scherer and Guido Palazzo, 'Toward a Political Conception of Corporate Responsibility: Business and Society Seen from a Habermasian Perspective' (2007) 32 *Academic Management Review* 1096, 1096 (explaining 'corporate social responsibility'); Joakim Sandberg, 'Understanding the Separation Thesis' (2008) 18 *Business Ethics Quarterly* 213, 214 (explaining the 'separation thesis').

⁹⁵ Hilary Putnam, *The Collapse of the Fact/Value Dichotomy and Other Essays* (Harvard University Press, 2002) 28 (discussing the 'entanglement of fact and value'); Jared D Harris and R Edward Freeman, 'The Impossibility of the Separation Thesis: A Response to Joakim Sandberg' (2008) 18 *Business Ethics Quarterly* 541, 542 ('Such entangled concepts apply directly to actual practices, which always embody both facts ("business" considerations) and values ("ethical" considerations). Consider, for example, the arrangement by which a business firm provides employment to a particular individual; has the corporation provided economic value, or moral value?').

a decision in one realm would have an impact on the other. Similarly, legal theorists are engaged in debate around this issue. The ‘legal positivist’ theory purports that the conditions of legal validity are purely a matter of social facts. Proponents of ‘natural law’ theory, on the other hand, claim that the conditions of legal validity are determined not only by social facts, but also by the moral content of the norms which bear on their legal validity. In other words, they argue that a putative norm cannot become legally valid unless it passes a certain threshold of morality.⁹⁶

We posit that senior managers whose discourses indicate an overriding affinity for the separation thesis philosophy of business and ethics will more willingly adopt an s-TIM type of innovation model. This would be the case since an s-TIM would provide mechanisms for legitimately minimising ethical consideration of external constituents while optimising short-term economic wealth for shareholders.⁹⁷ Likewise, it would be reasonable for senior managers whose discourses suggest a dominant inclination to follow an entanglement thesis philosophy to select m-TIMs. Accordingly, this would be the case since such a model would help them make sense of potentially conflicting economic objectives and other ethical or social demands. Therefore, we propose the following:

Proposition 3a: *Firms that are directed by managers with ethics discourses characterised as ‘separation’ are more likely to adopt s-TIMs.*

Proposition 3b: *Firms that are directed by managers with ethics discourses characterised as ‘entanglement’ are more likely to adopt m-TIMs.*

1.2 Change Narrative and Propositions 4a and 4b

Change narrative describes the type of sense-making narrative that helps management approach firm-level change. Change approaches are interesting since they provide schemata that enhance overall analysis and modification of the larger organisational processes necessary to support particular innovation models. Luescher and Lewis’s empirical research indicates that organisations may effectively use a ‘sparring’ narrative to approach organisational sense-making and complex change episodes.⁹⁸ Sparring as a narrative represents a collaborative change approach useful for addressing paradox,

⁹⁶ Ronald Dworkin, *Law’s Empire* (Belknap Press of Harvard University Press, 1986) (rejecting positivist theory—among other reasons—because of its institutional focus). See also Andrei Marmor, ‘Legal Positivism: Still Descriptive and Morally Neutral’ (2006) 26 *Oxford Journal of Legal Studies* 683, 686–7 (explaining the controversy between the two main contemporary versions of legal positivism regarding the precise meaning of the separation thesis).

⁹⁷ Harris and Freeman (n 95) 543 (‘When theorists suggest and managers enact an approach that views “business” decisions as if there are no moral consequences to them (eg, describing unfettered profit maximization as the “single objective function” of business firms), this inculcates a societal narrative about business and ethics in which ethical considerations are no less real, but merely devalued and denatured’).

⁹⁸ Lötte S Luescher and Marianne W Lewis, ‘Organizational Change and Managerial Sensemaking: Working through Paradox’ (2008) 51 *Academic Management Journal* 221, 225 (explaining a change approach called ‘sparring’).

uncertainty and dilemmas by interchanging between questioning and sense-making. This approach usually results in reduced risk anxiety surrounding decision making and, ultimately, leads to management action.⁹⁹ Managers with change schemas that represent forms of ‘sparring’ may view engagement of external stakeholders as a positive act and source of competitive advantage. These managers may confidently embrace change process complexity or ‘mess’ resulting from such engagement since they would see the possibility for organisational learning emerging from the involvement of external actors.¹⁰⁰

Furthermore, under the influence of other change narratives¹⁰¹ that emphasise strong internal, top-down planning, coordination and efficiency, management may view collaborative and discursive acts involving external constituents as risky and perhaps a threat to the firm’s competitive advantage. We refer to these other narratives as ‘planning’ and posit that when senior management is guided by a planning narrative, they will perceive acts of information disclosure as risky behaviour and, thus, will be more likely to adopt s-TIMs. Conversely, when management is guided by a sparring narrative, it will perceive acts of information disclosure as low risk and potential sources of competitive advantage and will be more likely to adopt m-TIMs. We propose the following:

Proposition 4a: *Firms that are directed by managers with change narratives characterised as ‘planning’ are more likely to adopt s-TIMs.*

Proposition 4b: *Firms that are directed by managers with change narratives characterised as ‘sparring’ are more likely to adopt m-TIMs.*

2. The Institutional Context: Legal Regimes and Governance

The institutional context is relevant since it determines the broad constraints, normative expectations and incentives that bind and mediate the informational decisions taken by innovating organisations.¹⁰² Typically, geopolitical entities and legal cultures establish

⁹⁹ Ralph Hertwig *et al*, ‘Decisions from Experience and the Effect of Rare Events in Risky Choice’ (2007) 15 *Psychological Science* 534, 535 (giving evidence that actors’ risk assessment of decision situations varies depending on information source, either from ‘experience’ or from ‘description’).

¹⁰⁰ Weick (n 91) 100; Luescher and Lewis (n 98) 227.

¹⁰¹ John P Kotter, *Leading Change* (Harvard Business Review Press, 1996) 33 (explaining a linear step-by-step process view of change management).

¹⁰² Lauren B Edelman, ‘Legal Environments and Organizational Governance: The Expansion of Due Process in the American Workplace’ (1990) 95 *American Journal of Sociology* 1401; Royston Greenwood and CR Hinings, ‘Understanding Radical Organizational Change: Bringing Together the Old and the New Institutionalism’ (1996) 21 *Academic Management Review* 1022, 1024 (‘Here we seek to provide a more complete account for understanding organizational interpretations of, and responses to, contextual pressures, by stressing the political dynamics of intraorganizational behavior and the normative embeddedness of organizations within their contexts’); Aguilera and Jackson (n 16) 449 (‘Where institutional environments are nationally distinct, isomorphic processes drive corporate governance practices to become more similar within countries and to differ across countries’); Hugh P Gunz and Sally P Gunz, ‘Hired Professional to

institutions with the aim of providing social assurances for citizens and reducing social costs arising from innovation harm. Although most industrialised nations predominantly use science-based risk analysis to establish legislation aimed at protecting human health and the environment, differences exist among countries. Various societies mandate different firm governance models and have developed different legal mechanisms to prevent certain harms that can be caused by new technologies. For example, in certain areas of regulation many European countries follow, by comparison with the United States, a more *ex ante* regulatory approach to protecting its citizens from certain harms (such as in the area of privacy and data protection or the regulation of genetically modified (GM) foods and seeds).¹⁰³ In cases where a legal regime addresses harms caused

- Hired Gun: An Identity Theory Approach to Understanding the Ethical Behaviour of Professionals in Non-Professional Organizations' (2007) 60 *Human Relations* 851 (exploring the impact of ethics and managerial decision-making); Hugh P Gunz and Sally P Gunz, 'Client Capture and the Professional Service Firm' (2007) 45 *American Business Law Journal* 685 (exploring the impact of ethics and managerial decision-making); Tatiana Kostova, Kendall Roth and Tina M Dacin, 'Institutional Theory in the Study of Multinational Corporations: A Critique and New Directions' (2008) 33 *Academic Management Review* 994, 997 (discussing the incongruence between multinational corporations and 'neoinstitutional theory'); Constance E Bagley, 'Winning Legally: The Value of Legal Astuteness' (2008) 33 *Academic Management Review* 378, 378 (examining the role of managerial attitudes and knowledge in relation to legal astuteness); Sandy Edward Green, Yuan Li and Nitin Nohria, 'Suspended in Self-Spun Webs of Significance: A Rhetorical Model of Institutionalization and Institutionally Embedded Agency' (2009) 52 *Academic Management Journal* 11, 30 (discussing empirical evidence that rhetoric assists with institutionalisation or legitimisation of organisational practices).
- ¹⁰³ Charles D Kolstad, Thomas S Ulen and Gary V Johnson, 'Ex Post Liability for Harm vs Ex Ante Safety Regulation: Substitutes or Complements?' (1990) 80 *American Economic Review* 888 (providing an economic analysis of the interplay between *ex ante* regulation and *ex post* policies for correcting externalities and concluding that there is complementarity and not substitutability between the two approaches because *ex ante* regulation can correct inefficiencies in cases of uncertainty); Joel R Reidenberg, 'Resolving Conflicting International Data Privacy Rules in Cyberspace' (2000) 52 *Stanford Law Review* 1315, 1345–6 ('Significantly, the American commitment to liberal values for information flows is supported by the absence of public enforcement mechanisms for First Principles. The sparse existence of legal rights proffers few judicial remedies and there is no Data Protection Commission in the United States. The state does not act as the direct protector of citizens. Instead of public sanction, private initiative offers the principal means of enforcement of fair information practices. By relying on private action, citizens must vindicate their own interests and the opportunities for state interference with information privacy are limited. By design, in this liberal approach, law is ad hoc and reactive'); Ragnar E Löfstedt *et al*, 'The Changing Character of Regulation: A Comparison of Europe and the United States' (2001) 3 *Risk Analysis* 399 (suggesting that the regulatory regimes of the United States and Europe are going through fundamental changes, in that Europe is implementing many of the regulatory procedures that were advocated by the Americans in the 1970s and the 1980s and the Americans are putting forward policies that are very similar to those put in place by the Europeans as late as the early 1990s); Dominik Böllhoff, 'The New Regulatory Regime: The Institutional Design of Telecommunications Regulation at the National Level' in Adrienne Windhoff-Héritier (ed), *Common Goods: Reinventing European Integration Governance* (Rowman & Littlefield, 2002) 244 (explaining that new European regulatory agency models, in contrast to the United States, combine legislative, executive and judicial functions and, thus, enable regulatory agencies to act in a proactive and *ex ante* manner); Jonathan B Wiener and Michael D Rogers, 'Comparing Precaution in the United States and Europe' (2002) 5 *Journal of Risk Research* 317 (questioning what the authors call the conventional wisdom that the European Union endorses the precautionary principle and proactively regulates uncertain risks, while the United States opposes the precautionary principle and waits for evidence of harm before regulat-

by new technologies in a more reactive approach, aggrieved parties can bring lawsuits against alleged harm-causers and courts can then impose liability *ex post* on the firm or actor that caused the harm. In the United States, punitive damages serve as an additional deterrent to the innovator and others who may consider engaging in the same harm-producing conduct again. This leads into our arguments for two institutional variables that mediate innovation decisions taken by managers.

2.1 Legal Liability Regime and Propositions 5a and 5b

2.1.1 Fault-Based, Strict and Enterprise Liability Regimes

Liability regimes can range from fault-based to strict and so-called ‘enterprise liability’. A group of scholars—mostly in the United States—has begun to argue that manufacturers should be held strictly liable for all product-caused harm. This would include not only harms resulting from manufacturing defects, but also harms caused by design defects and inadequate warnings. This proposed system, which is the subject of fierce debate among product liability scholars, is generally referred to as *enterprise liability*.¹⁰⁴

ing); David Vogel, ‘The Hare and the Tortoise Revisited: The New Politics of Consumer and Environmental Regulation in Europe’ (2003) 33 *British Journal of Political Science* 557 (discussing a shift in the pattern of divergence between consumer and environmental protection policies in Europe and the United States. While from the 1960s to the mid-1980s American regulatory standards tended to be more stringent, comprehensive and innovative than in either individual European countries or in the European Union (EU), since around 1990 many important EU consumer and environmental regulations show a more precautionary approach than their American counterparts).

¹⁰⁴ *Black’s Law Dictionary* defines Enterprise Liability as ‘liability imposed on each member of an industry responsible for manufacturing a harmful or defective product, allotted by each manufacturer’s market share of the industry’: *Black’s Law Dictionary* (Thomson Reuters, 9th edn 2009); for a history of enterprise liability and a critique of the Restatement (Third) of Torts’ claim that existing areas of strict liability are simply a set of special cases, see Gregory C Keating, ‘The Theory of Enterprise Liability and Common Law Strict Liability’ (2002) 54 *Vanderbilt Law Review* 1285, 1286 (‘The distinctive modern form of strict liability—enterprise liability—is a particular articulation of what it means to make agency the basis of responsibility. Two propositions form the core of enterprise liability. First, activities should bear their characteristic accident costs. Fault liability pins the costs of the nonnegligent accidents that are the long-run price of an activity’s presence in the world on the random victims of the activity. Enterprise liability pins those accident costs on the activity—the enterprise—which imposed the nonnegligent risks responsible for the injuries at issue ...’); Mark Geistfeld, ‘Should Enterprise Liability Replace the Rule of Strict Liability for Abnormally Dangerous Activities?’ (1998) 45 *UCLA Law Review* 611 (discussing enterprise liability); Jon D Hanson and Douglas A Kysar, ‘Taking Behavioralism Seriously: Some Evidence of Market Manipulation’ (1999) 112 *Harvard Law Review* 1420 (concluding that enterprise liability, as a market-based regulatory scheme, eliminates much of the incentive that manufacturers otherwise would have to manipulate consumer risk perceptions); James A Henderson, Jr and Jeffrey J Rachlinski, ‘Product-Related Risk and Cognitive Biases: The Shortcomings of Enterprise Liability’ (2000) 6 *Roger Williams University Law Review* 213 (criticising ‘the new rhetoric supporting EL’ as having only superficial appeal); Gregory C Keating, ‘Pressing Precaution beyond the Point of Cost-Justification’ (2003) 56 *Vanderbilt Law Review* 653, 660 (arguing that cost-benefit analysis is inadequate when devastating injuries can result from certain activities, and offering a moral theory to justify increasing the required level of precautionary measures beyond the point of cost-justification).

Enterprise liability goes beyond just expanding liability to all product-caused harm. It allows a plaintiff to hold an entire industry responsible for harm caused by an industry-wide standard when it is impossible to identify a particular harm causer.¹⁰⁵ Members of the industry can be held jointly and severally liable for injuries incurred.¹⁰⁶ This difference has significant information behavioural ramifications: under an enterprise liability regime, courts could decide a case without consideration of an innovating firm's informational behaviour. Thus, the law arguably might create a disincentive for firms to disclose information, since such disclosure would have associated costs without any anticipated return. Yet, James Henderson and Jeffrey Rachlinski note that most of the legal scholarship comparing fault-based liability and enterprise liability concludes that both systems create comparable incentives for manufacturers to invest in product safety and that both pressure manufacturers to incorporate optimal cost-effective precautions into their products.¹⁰⁷ However, enterprise liability may undermine consumer incentives to avoid accidents. Thus far, this seems to have discouraged widespread adoption of an enterprise liability system.¹⁰⁸

2.1.2 Liability Shields: State-of-the Art and Permit Defences

Frequently, defendants in product liability cases seek to avoid liability for their products on the grounds that the designs conform to the 'state of the art'.¹⁰⁹ European environmental legislation, for example, provides for state of the art and permit defences, which allow a polluter to avoid the cost of remedial actions where the polluter can demonstrate that he was not at fault or negligent and the environmental damage was caused by an emission that was authorised under applicable national laws, or an emission or activity which the polluter demonstrates was not considered likely to cause environmental

¹⁰⁵ The classic example of an enterprise liability lawsuit is *Hall v EI du Pont de Nemours & Co*, 345 F Supp 353 (EDNY 1972). In that case, 18 separate accidents occurred in which children were injured by blasting caps. The plaintiffs sued six blasting-cap manufacturers (effectively the entire US blasting-cap industry) and their trade association, which was responsible for some safety choices. The plaintiffs did not allege that any one of the manufacturers caused any of the particular injuries, merely that the industry as a whole had failed to take adequate safety precautions. The court ruled that the defendants, taken together, exercised sufficient control over the risks of their products that liability was appropriate. However, the court also noted that this sort of enterprise liability would probably only be appropriate (and fair) if applied to small industries (no more than five or ten manufacturers). *Ibid*, 378.

¹⁰⁶ Keating (n 104) 1286 ('enterprise liability holds that an enterprise's accident costs should be distributed among the members of the enterprise. The costs of an injury should be shared by those who profit from the activity responsible for the injury; they should not be concentrated on the injured party, or be dispersed across unrelated activities').

¹⁰⁷ Henderson and Rachlinski (n 104) 216.

¹⁰⁸ *Ibid*, 216.

¹⁰⁹ In US law, the term 'state of the art' has been variously defined to mean that the product design conforms to industry custom, that it reflects the safest and most advanced technology developed and in commercial use, or that it reflects technology at the cutting edge of scientific knowledge. See Restatement (Third) of Torts: Products Liability, § 2 cmt d (1998).

damage according to the state of scientific and technical knowledge at the time when the emission was released or the activity took place.¹¹⁰ In the United States, the term ‘state of the art’ has been variously defined by a multitude of courts to mean that the product design conforms to industry custom, that it reflects the safest and most advanced technology developed and in commercial use, or that it reflects technology at the cutting edge of scientific knowledge.¹¹¹ A few US jurisdictions recognise a defence based upon conformance with the state of the art. Of these jurisdictions, some focus on the state of the art at the time the product was designed, while others concentrate on the state of the art at the time the product was placed into the stream of commerce.¹¹² Although innovators may avoid liability by deploying state-of-the-art or permit defences, harms arising from such claims may still stand. As a result, the burden of the harm and its remedy is shifted from the innovator to others and society. Our theory is concerned with innovators’ behaviours in relation to information that is reasonably accessible and known at the time the product is introduced to the market. We are especially concerned about situations in which innovators have decided to conceal or omit that information. We argue that various liability shields might encourage innovators to hide information, perhaps more so when innovators conceive the information to be indeterminate and less likely to be known by others outside the boundaries of the firm.

2.1.3 Geopolitical Dimension

The legal liability regime variable refers to the type of liability exposure imposed upon innovators by the geopolitical or jurisdictional entities with decision-making powers. We propose that the institutional context, as expressed by the legal liability regime variable, has a significant impact on innovating firms’ decisions, behaviours and outcomes.¹¹³ The specific liability regime developed by a geopolitical entity contributes to setting innovators’ expectations about the potential costs and benefits of disclosure and discourse with constituents. Smyth *et al*, looked into the Canadian, United States, Danish and German liability regimes in the agricultural biotechnology context. They argue that the respective liability regimes have substantially different impacts on the level of innovation of the four countries studied.¹¹⁴

¹¹⁰ Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, Art 8(4).

¹¹¹ Restatement (Third) of Torts: Products Liability, § 2 (1998).

¹¹² Ind Code § 33-1-1.5-4(b)(4) (1988) (conformance with the generally recognised state of the art at the time the product was designed is an affirmative defence to an action based in strict liability in tort).

¹¹³ Elizabeth Alexander, ‘The Effect of Legal Environment on Innovation Performance of Collaborative External Knowledge Strategies’ [2008] *Academy of Management Annual Meeting Proceedings* 1, 3 (demonstrating with empirical evidence that the type of legal regime may predict innovating firms’ strategic decisions and performance).

¹¹⁴ Smyth *et al* (n 61) 35–60 (‘This assessment of the North American liability system reveals that liability in both Canada and the United States is not a significant barrier to innovation of agricultural biotechnology ... Based on the above analysis, the existing legal frameworks within both Canada and the United States

2.1.4 Conclusion and Proposition

From our analysis of the debates above, we propose that the institutional context, in the form of a legal liability regime choice and other variables that we explain below, has a significant impact on an innovator's decisions and behaviours. The particular liability regime used by a geopolitical entity or jurisdiction contributes to setting innovators' expectations about the potential costs and benefits of disclosure and discourse with constituents. Also, as is widely understood, a firm's corporate governance model is highly correlated with that firm's geopolitical affiliation and sets parameters for critical management decisions.¹¹⁵

While the arguments suggesting a causal association between liability regime type and informational behaviour as expressed in innovation model choice are compelling, we argue below that strict liability regimes induce greater innovation disclosure. The legal environment consists of both substantive laws guiding informational behaviour as well as procedural rules governing litigation and enforcement. 'Procedural formalism' describes the degree of formality of the legal rules that regulate the process of dispute resolution in the courts. Procedural formalism varies systematically among legal regimes, and thus the procedural costs associated with various legal regimes also vary.¹¹⁶ The dimensions of this construct include formality of legal structures, litigation intensity, contract enforcement, degree of court bureaucracy, and dispute settlement duration. In particular, recent empirical evidence identifies a relationship between the success of a firm's innovation strategy and the degree of procedural formality associated with the geopolitical legal regime in its home country.¹¹⁷ High legal formality countries are those that have complex and difficult litigation procedures, long case settlement periods, and thus a low propensity for legal actions. Conversely, low legal formality countries are those that offer court systems that are easier to use as compared with high legal formality

appear capable of handling any adverse effects potentially triggered by agricultural biotechnology. Although regulatory agencies implementing the various statutes must continuously assess the adequacy of their oversight procedures in light of new technological developments, the existing legal framework provides an adequate balance between environmental and safety precaution with the public policy of fostering innovations with the biotechnology industry ... The use of the Precautionary Principle in Europe goes back to 1990 as it originated from the environmental damages to forestry. As a result, Europe's approach toward a liability framework has differed greatly from the North American experience ... Both the Danish and German liability legislation is considerably broader than that of either Canada or the United States. While farmers in North America have not been hindered in producing GM crops by liability law suits or the paying of compensation, this will not likely be the case in Denmark or Germany. The necessity of having adopters fund the compensation fund is unprecedented in crop agriculture, especially from a North American perspective. This tax on adopters will, without doubt, have a negative impact on the level of adoption of GM crops').

¹¹⁵ Aguilera and Jackson (n 16) 459 (examining differences in corporate governance across countries).

¹¹⁶ Simeon Djankov *et al*, 'Courts' (2003) 118 *Quarterly Journal of Economics* 453, 456 (providing empirical evidence for the proposition that procedural formalism varies systematically among legal origins, and arguing that civil law countries regulate dispute resolution heavily compared to common law countries).

¹¹⁷ Alexander (n 113) 1.

countries, shorter dispute settlement periods, and, therefore, a high propensity for legal actions.

Although it is possible that a strict or enterprise liability regime might discourage information disclosure and discourse since these actions would not be considered by courts when deciding cases against innovators,¹¹⁸ we argue that the opposite would be most likely.¹¹⁹ For example, if disclosure is reconceived to include meaningful discourse with external constituents, then an enterprise liability regime would actually encourage innovators to invest more in information and discourse (and, thus, possibly be more inclined to adopt m-TIMs). Under such a regime, once a constituent begins a legal process, the probability of an unfavourable result or a higher combined litigation and settlement cost per lawsuit for the firm might be greater than under a fault-based system. We assert that this would incentivise innovators to preemptively deter potential legal actions which would reduce the number of cases: innovators would calculate that the costs of effective preemptive disclosure and discourse are worthwhile investments if such actions result in fewer lawsuits. This might be especially true given that courts have found liability shields to be weaker defences and therefore less relevant under strict regimes.¹²⁰ However, depending on disclosure and litigation costs, expected procedural costs, and the probability of cases arising, such calculations might indicate that the costs of disclosure are only marginally worthwhile investments. As such, we arrive at the following propositions:

Proposition 5a: *Firms that are operating in geopolitical entities with low procedural formality, strong liability shields, and legal liability regimes characterised as ‘fault-based liability’ are more likely to adopt s-TIMs.*

Proposition 5b: *Firms that are operating in geopolitical entities with high procedural formality, weak liability shields, and legal liability regimes characterised as ‘enterprise liability’ are more likely to adopt m-TIMs.*

¹¹⁸ Craswell (n 53) 620 (‘To be sure, disclosure standards set at such a high level might not be appropriate in a regime that aimed to alter or improve the information that sellers disclosed. But high disclosure standards might nevertheless be attractive to any court that believed, perhaps only subconsciously, that it was more appropriate to hold sellers absolutely liable for certain kinds of risks’).

¹¹⁹ Hanson and Kysar (n 104) 1560 (‘The only hope of substantially reducing manufacturer manipulation is to eliminate the incentive to manipulate in the first place. Under an enterprise liability regime, because there would no longer be a mechanism for avoiding liability for product-caused accidents, manufacturers’ incentives to manipulate product risk perceptions would be diminished, if not eradicated. In fact, we believe manufacturers would actually have an incentive to sharpen consumer awareness of many product hazards under such a regime. Only through such awareness could certain accidents be avoided and manufacturer liability be minimized’); Henderson and Rachlinski (n 104) 219 (arguing that enterprise liability would ‘aggravate the incentives that manufacturers already face to exaggerate the risks products pose, resulting in a social excess of safety precautions’).

¹²⁰ David G Owen, ‘Bending Nature, Bending Law’ (2010) 62 *Florida Law Review* 570, 587 (‘Yet, the relevance of state of the art to strict liability claims was more problematic’).

2.2 Governance Model and Propositions 6a and 6b

Governance model orientation refers to the type of governance model firms use to guide firm control, establish policies, make strategic decisions, allocate resources and engage stakeholders. Geopolitical entities, through discourse primarily between political and economic interests, have evolved governance models with the aim, to varying degrees, of solving the classic principal-agent problem while protecting the interests of various stakeholder groups.¹²¹ Governance models frame firms' interactions with external stakeholder groups by establishing boundary conditions and limiting the degree to which firms involve stakeholder groups in strategic decision-making and innovation activities. Two common contemporary models are referred to as 'contractual' (also known as 'shareholder') and 'stakeholder'.¹²² In common law countries, firms often originate and operate with governance models that are typified as contractual and aim to optimise shareholder returns by minimising agency costs. Under transaction cost theory, the degree to which a particular stakeholder group has rights and involvement in the firm's strategic decision-making is a function of that stakeholder's contract with the firm.¹²³ Firms chartered and operating within civil law countries deploy stakeholder models that typically include firm-external linkages as components of the firm. Stakeholder models aim to mediate between the objectives of all stakeholder groups and usually are not solely driven by profit and wealth maximisation. Stakeholder organisations' edges are usually permeable and, thus, encourage engagement with various internal and external stakeholders.¹²⁴

In addition, Aguilera and Jackson propose that management's ideologies have a significant impact on how the two models are deployed.¹²⁵ They argue that management ideologies vary depending on geopolitical entity and governance model. They describe two ideological categories: autonomous and committed. Managers who have autonomous orientations may tend to favour hierarchical control and focus on financial measures of performance. Conversely, managers with committed orientations tend to favour consensus that fosters commitment to the firm's constituents, external and

¹²¹ RM Conroy, 'Corporate Governance in Three Economies: Germany, Japan, and the United States', Darden Business Publishing Case Study 6/2007 (2002), 1, <http://ssrn.com/paper=1279336> (explaining diverse corporate governance models deployed in three countries); Aguilera and Jackson (n 16) 13 (comparing a variety of corporate governance systems found in various countries); John W Cioffi and Martin Höpner, 'The Political Paradox of Finance Capitalism: Interests, Preferences, and Center-Left Party Politics in Corporate Governance Reform' (2006) 34 *Politics & Society* 463, 465 (comparing inter-country divergent corporate governance systems in the United States, Germany, France and Italy); David F Larcker and Brian Tayan, 'Models of Corporate Governance: Who's the Fairest of Them All?', Rock Center for Corporate Governance at Stanford University Teaching Case 1/2008 (2008), 1, 3, <http://ssrn.com/paper=1482074> (comparing a variety of corporate governance systems found in various countries).

¹²² Larcker and Tayan (n 121) 3.

¹²³ Aguilera and Jackson (n 16) 447.

¹²⁴ Larcker and Tayan (n 121) 13.

¹²⁵ Aguilera and Jackson (n 16) 458.

internal, and focus on technical excellence. When integrating managerial ideology and governance models, we arrive at the following propositions:

Proposition 6a: *Firms that are directed by managers with autonomy ideologies and operate with governance models typified as contractual are more likely to adopt s-TIMs.*

Proposition 6b: *Firms that are directed by managers with commitment ideologies and operate with governance models typified as stakeholder are more likely to adopt m-TIMs.*

Contractual model firms with autonomy managers will be more likely to adopt s-TIMs since they will tend to favour hierarchical decision-making. Management may perceive s-TIMs as legitimising selective involvement of stakeholder groups, especially if the needs of particular external groups conflict with profit maximisation. Conversely, stakeholder firms with commitment managers are more likely to adopt m-TIMs. In this case, power-sharing and information disclosure would coherently support management's goals of reaching consensus among diverse stakeholder groups and greater technological and social integration.

IV. FUTURE RESEARCH AND CONCLUSION

Management and innovation research has contributed to a greater understanding of how innovation produces benefits, especially for firms. However, the extant literature has lacked a theoretical framework that yields insight into the determinants of innovation model adoption and harm. Drawing from management, innovation, ethics, economics and legal literature, we argue that model choice is a critical factor that, in turn, influences information sharing and discourse and, ultimately, innovation outcomes. Our paper proposes that innovation model choice, moderated by management's ethics discourses and change narratives coupled with mediating legal liability regimes and governance models, shapes the harmful or beneficial innovation paths that emerge from firms. In addition, the paper supplies detailed conceptions of harm and meaningful innovation as well as a typology of innovation models centred on the combined notions of information sharing and discourse.

Investigators can empirically study our proposed predictive model by testing the six propositions delineated above. Existing data sets about various firms' innovation efforts, harmful outcomes and institutional constraints would be useful in doing so. Furthermore, surveys that capture management's ethical discourses and change narratives would be necessary. The empirical evidence cited for each proposition often gives validated measures for use by surveyors. Regarding our proposed innovation typology, detailed research utilising methods such as text analysis on a wider range of commonly adopted models would be interesting and would help to validate our proposed classifi-

cation system. For research site or setting, we suggest that investigators comparatively focus on firms chartered and operating in diverse legal regimes.

However, our theory and harm construct has limitations. Interdisciplinary research is, by its very nature, broad and challenging given the limitations that arise from discipline differences in vocabulary and research methods. Despite these limits, we have endeavoured to derive, from both management and law literature, those factors that logically predict harm outcomes arising from innovation. Yet our assumptions may warrant further investigation and input. For example, we understand that other factors such as competitive standing, ownership structure (eg private versus public) and financial condition might contribute to innovation model choice. While we have reason to believe that these are secondary predictors, perhaps subsumed into our discourse and narrative variables, this may not be the case entirely. Lastly, we have not considered the moderating effects of harm recipients' behaviours and suspect that the harm construct will need further development.

In conclusion, our theoretical framework widens innovation discourse to include harm. While some critics might rightfully suggest that various forms of 'risk assessment modeling' (RAM) would prevent or mediate harm to external constituents, we argue that such programs are ultimately limited and may not prevent harm.¹²⁶ Given that risk is perceived,¹²⁷ many RAM methods rely upon firm-centric interpretations or perceptions of external data and, thus, exclude an externalised cognition of events and potential outcomes. Policy-makers and legal professionals may find our research useful for generating insights into firm innovation processes and the means by which institutional determinants contribute to innovation outcomes. For innovating firms, we believe that this research and framework is useful since it provides a language for management discussions about innovation and consequences. In particular, this information sheds theoretical light on a previously underexplored area and suggests that the choice of innovation approach does matter, especially when considering consequences to a broad array of stakeholders. We hope our paper sensitises both researchers and managers so that they become more aware of innovation model choices and outcomes. As a complement to the extant literature, our paper suggests the need for more research—research that is richer and balanced—about innovation, information and harm. It is our hope that innovating firms become more socially productive and sustainable.

¹²⁶ Erik Lichtenberg, 'Economics of Health Risk Assessment' (2010) 2 *Annual Review of Resource Economics* 53, 55 ('We use this model to discuss shortcomings of standard risk assessment methods as decision support aids for environmental health risk management').

¹²⁷ Paul Slovic *et al*, 'Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality' (2004) 24 *Risk Analysis* 311 (arguing that risk is perceptual and not objective); Paul Slovic, *The Feeling of Risk: New Perspectives on Risk Perception* (Routledge, 2010) (explaining the interactive roles of feeling and cognition in the perception of risk).