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Government Information Quarterly 24 (2007) 827–839

**Government
Information
Quarterly**

Information asymmetry and information sharing

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Abstract

Although much digital divide research focuses on access to technology, another cause of the divide is the lack of information awareness that we call information asymmetry. Information asymmetry often stems from inadequate information sharing and can result in negative consequences for both the information poor and the information rich. Information asymmetry has been insufficiently studied as a possible cause of underdevelopment and inequality. In response, we develop a typology to classify information asymmetry into two categories, horizontal and vertical, and then identify those information sharing practices that cause the imbalance. To illustrate the negative consequences of information asymmetry and the potential benefits of information sharing, we discuss two examples from the experiences of modern American Indian tribes. First, Indian tribes face horizontal information asymmetry when they attempt to access the capital markets, and second, they face vertical information asymmetry in terms of law enforcement data sharing. This article also describes our ongoing examination of horizontal information sharing among tribes and vertical information sharing between tribes and others sovereigns in the American polity as possible solutions to the problems created by information asymmetry. These strategic responses are embodied in two information systems, the Tribal Financial Information Clearinghouse and an Intergovernmental Tracking System for sharing law enforcement data. We conclude with a discussion of how our typology can be more generally applied to other instances of information asymmetry.

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1. Introduction

Information asymmetry exists when a party or parties possess greater informational awareness pertinent to effective participation in a given situation relative to other participating parties. This article draws on two actual instances, presented in Section 2, each of which describes information asymmetries characteristic of the experience of many American Indian¹ tribes. We have developed a typology of information asymmetries – horizontal and vertical – and explore appropriate strategies their resolution often requires in Section 3 of this article. In Section 4, we apply this typology to the study of the horizontal asymmetry impeding the ability of most tribal governments to achieve economic development and then examine a strategic initiative to resolve this asymmetry. Section 5 examines the vertical asymmetry undermining reservation law enforcement for domestic violence crimes and then discusses a proposed mechanism to resolve that asymmetry. Section 6 concludes with an examination of how our typology may be more generally applied to situations outside the tribal context.

2. The nature of information asymmetry

The following examples, developed from actual instances, describe information asymmetries characteristic of the experience of many American Indian tribes and illustrates the nature of information asymmetry and the associated challenges. Both instances are examples of information asymmetry, yet a core difference between them dictates differing strategic responses.

In the first example, Valerie Red-Horse is the treasurer for a tribe in the southeastern United States. Her tribe, like many others, suffers from high unemployment and inadequate infrastructure. Recently, the tribe successfully reclaimed some ancestral homeland containing timber resources which will produce a steady income stream. To improve tribal infrastructure, Valerie suggests the tribe issue a tax-exempt bond backed by the timber revenues to construct a new tribal administration building, housing for older members, and to address other glaring infrastructure needs. The tribal council asks Valerie to determine what the market would require for financial terms, but Valerie quickly discovers that unlike the municipal bond market generally, there is no centralized set of information regarding tribal bonds. Furthermore, she has no way to verify the accuracy of the information her tribe receives from the investment banking community regarding market rates and industry standard practices. When she inquires of neighboring tribes, she discovers that many of those tribes are similarly in the dark regarding the tribal finance marketplace.

In a second example, Jason O'Neil is the tribal police chief for the Chickasaw Nation in Oklahoma, where a significant number of non-Indians live within the borders of the

¹ Although both “Indian” and “Native American” are equally valid terms to describe tribal members, the term “Indian” has legal significance in the United States. Specific jurisdictional issues are unique to “Indian Country,” which is defined in 18 U.S.C. § 1151 to include Indian reservations and other dependent Indian communities. This article uses the term “Indian,” except when “Native American” is part of the official name of an organization.

Chickasaw Nation. One evening, the tribal police are called to a tribal member's home where they discover a man sexually assaulting a teenage Chickasaw girl. The tribal police take the man into custody and take the girl to the hospital. If the man is an Indian, the tribe can prosecute him, but if he is non-Indian, because of one particular Supreme Court case,² the tribe cannot assert jurisdiction. To compound the problem, because federal law precludes state jurisdiction if the victim is an Indian, Jason's only option is to refer the case to the United States Attorney for prosecution. As he has done in the past, Jason gathers all of the evidence collected by the tribal police officers and sends it to the U.S. Attorney. At this point, however, Jason has no ability to obtain information about the disposition of the case, as the U.S. Attorney has no obligation to inform the tribe regarding its prosecutorial activities. After several months, nothing appears to have happened, and Jason has grown tired of repeatedly calling the U.S. Attorney only to be told that "the case is in the system." Eventually, Jason receives a terse one-sentence e-mail indicating that the U.S. Attorney has declined to prosecute. Jason's experience is not unique, as this situation occurs repeatedly for tribes all across the country. Nobody knows the full extent of the problem because, unlike their state and local counterparts, tribal prosecutors do not have access to information about federal prosecutions.

While each of these situations presents an example of information asymmetry, the nature of each asymmetry is different. Our analysis suggests that the differences between these two situations dictate different strategic responses in terms of resolving the asymmetries. While digital divide research has focused on information asymmetry that may exist because of disparities in access to information tools or educational training (Yu, 2006), we find information asymmetry is often the product of differential information sharing practices. Some information asymmetries are due to deliberately withheld information, others to habits of information use, still others to insufficient incentives to share information. In any case, asymmetry due to information sharing practices cannot be rectified through technological grants and technical education alone. New information sharing practices are required to resolve these information asymmetries and to produce greater information awareness.

Whatever the cause, the effect of information asymmetry is frequently the same for the *information poor* in terms of their interactions with the *information rich*. For example, the information poor are in a weaker position to negotiate contracts or settlements. They cannot as effectively advocate for public policy, or persuade others to join their cause. Furthermore, any information asymmetries that lead to unfair agreements result in unrealized opportunities for third parties. In the case of the financial markets, the opportunity cost of lost transactions harms all parties that would benefit from greater amounts of economic activity within the given space. Such negative impacts can trickle even further. If information asymmetries between tribes and participants in the capital markets perpetuate reservation underdevelopment, the American public must then provide more welfare payments to poor tribal members.

² *Oliphant v. Suquamish Indian Tribe*, 435 U.S. 191 (1978).

3. Horizontal and vertical information asymmetry

In our classification scheme, horizontal information asymmetry exists when valuable information is scattered among similarly-situated entities. While some of those entities may have more information than others, no entity has the complete set of information. External entities with access to greater information about the information poor entities will have informational power over any *individual* entity among the class possessing scattered information and over the *entire class* as a whole. Fig. 1 depicts this situation, where entities A1 and A2 are similarly situated, but neither has the complete set of information possessed by entity B. Horizontal information sharing is a strategy available to the information poor to eliminate such information asymmetry—a strategy that does not depend on the participation of the information rich. The information poor can share and integrate information such that they are able to produce information awareness equal, or more closely equal, to the information rich.

Vertical information asymmetry exists when one type of entity holds information another does not, and a complete set of information does not exist in an aggregated collection of information poor entities. In Fig. 2, such asymmetry exists between entities A and C. Vertical information sharing is a viable strategy to flatten this form of information asymmetry, but such a strategy requires the cooperation of the information rich. For instance, legislation such as the Freedom of Information Act can force parties to disclose critical information for the benefit of previously information poor parties. Incentives can encourage the information rich to volunteer important information. Financial payment or opportunities are obvious forms of incentives.

Our analysis identifies both types of information asymmetry in the context of American Indian tribes and their governments. In the remainder of this article, we apply our information asymmetry typology drawn from this analysis to elucidate those examples as well as the responsive strategies tribes might consider. Our findings suggests that solving either form of information asymmetry through information sharing benefits both the information rich and the information poor.

4. Information asymmetry and capital markets

Issuing tax-exempt debt in the form of bonds for infrastructure development – roads, water treatment plants, and even convention centers – continues to play a catalytic role in stimulating

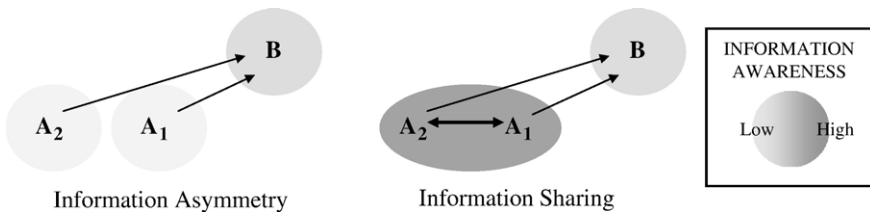


Fig. 1. Horizontal information asymmetry and information sharing.

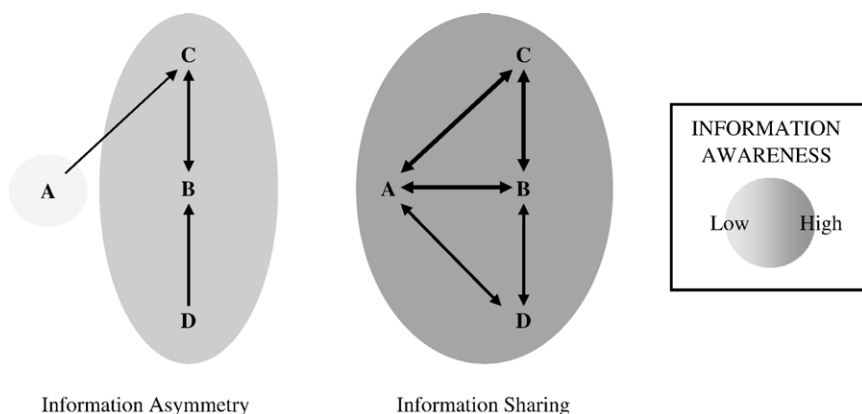


Fig. 2. A model of vertical information asymmetry and sharing.

local economic growth (Coronado, 1999; Hildreth, 1993), as it has for more than two centuries (Hillhouse, 1936) because tax-exempt debt can be issued at lower interest rates.

A recent study of more than 1700 non-tribal tax-exempt bonds found not only that the “most critical consequence” of information asymmetry is higher borrowing costs, but also that “alleviating information asymmetry” reliably eliminates the risk premium and reduces borrowing costs, particularly for new or infrequent issuers (Peng & Brucato, 2004). A similar study examined 500 years of sovereign-issued debt, finding that greater transparency produced by information sharing eliminates the risk premium imposed on unseasoned borrowers (Tomz, 2001).

Explanations for these findings may be found by analyzing markets as socially-constructed knowledge networks (Preda, 2002) relying on economic knowledge co-created by professional networks and expressed in shared information objects making putatively objective market indicia (e.g. prices) intelligible and actionable for market participants (Abolafia, 1996; Abolafia & Kilduff, 1988; Preda, 2002; Rouleau, 2005; Sethi & Compeau, 2002; Zajac & Westphal, 2004; Zuckerman, 1999). Non-tribal municipal officials are members of a complex knowledge network, and their tax-exempt bonds are issued in well-established markets that have matured over the last four decades (Maco, 2001). The various participants – state and local governments, credit rating agencies, underwriters, and investors – share access to their collective market experiences with the overall effect that borrowers obtain needed capital at favorable rates (Diamond, 1989; Dowines & Heinkel, 1982; Fairchild & Ellis, 1998; Simonsen & Hill, 1998). In contrast, most tribes are not established members of this network and very few tribal governments have experience with debt financing (Ramirez, 2004).

4.1. Horizontal information asymmetry in tribal finance

As separate sovereign governments, Indian tribes, just like state and local governments, have an obligation to improve the lives of their citizens. Unlike state and local governments, however, tribal governments are more limited in their ability to access the capital needed to

fulfill their obligations. No studies of information asymmetry in the tribal finance market exist, but studies in other contexts find that poor informational awareness reduces investment and local economic development (Abhijit & Andrew, 1998; Alam & Walton, 1995; de Wet, 2004; Michaël & Louis, 2006; Stephan, Eric, & Madeleine, 2000; Van Nieuwerburgh & Veldkamp, 2006). Interviews with tribal and non-tribal market participants indicates that non-tribal entities collectively enjoy a much broader and deeper awareness of the evolving tribal finance marketplace than all but a few tribes. Even financially sophisticated tribes are at a strategic disadvantage, as there is no system for horizontal information sharing between tribes about the tribal financial marketplace. Tribes pay a steep price for this information asymmetry.

- Nearly \$50 billion in capital needs go unmet each year in Indian Country in such vital sectors as infrastructure, community facilities, and housing (USCCR, 2003). Obviously, water, sewers, roads, telephones, electricity, and the like are taken for granted by investors even in the most distressed inner cities of the United States. The absence of a comparable infrastructure in many tribal communities creates significant disincentives to new private-sector investment.
- Only 15% of the tribes have been able to obtain some type of debt financing (Hyatt, Israel, & Benjamin, 2004).
- Tribal governments issue less than .001% of the tax-exempt bonds issued annually though they serve 2% of the U.S. population (Clarkson, 2007).

4.2. Horizontal information sharing as a strategic response

Our research suggests horizontal information sharing is a viable strategic response to the problem of horizontal information asymmetry. By sharing certain types of market information, tribal governments will be in a better position to identify and pursue local development opportunities in a much more cost-effective and timely manner. Such inter-governmental information sharing must overcome any reluctance to share information. However, as contributing up-to-date information bears costs in resources and time, and governments may not want to disclose sensitive data they fear might compromise their interests or reputation. Nonetheless, a substantial body of literature has emerged analyzing the circumstances in which the self-interest of parties holding private information aligns with a collective interest in developing a public information good (Flanigan, Monge, & Fulk, 2001; Fulk, Heino, Flanigan, Monge, & Bar, 2004; Hollingshead & Brandon, 2003; Marwell & Oliver, 1993; Monge et al., 1998; Yuan et al., 2005). Much of this work centers on the specific problem of contributions of private or sensitive information to collective databases as non-excludable goods.

4.3. The Tribal Finance Information Clearinghouse

NSF-funded research (IIS 0534905) suggests a need for a new information infrastructure to facilitate inter-tribal sharing of market-relevant knowledge and financial information in order to alleviate the horizontal information asymmetry that tribes currently face when attempting to access the capital markets. Our efforts include developing a prototype Tribal Finance

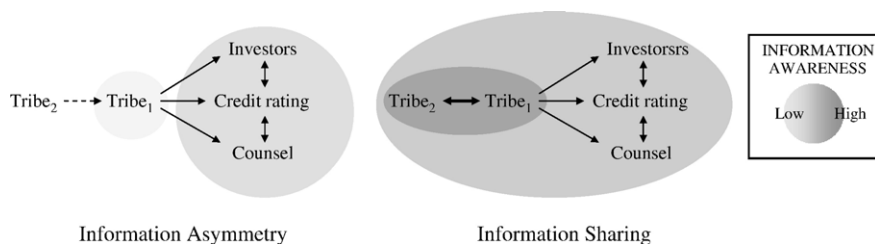


Fig. 3. Horizontal information sharing of tribal finance data.

Information Clearinghouse (“TFIC”)³ to aggregate and integrate market-relevant information provided by tribes. Fig. 3 depicts how horizontal information sharing can alleviate horizontal information asymmetries confronting tribes. When Tribe₁, Tribe₂, etc., contribute to a collective information good, each can quickly assess the marketplace, identify comparables, and make decisions based on a set of information that is at least as complete as that held by external parties, such as investment banks, law firms, and credit rating agencies.

Preliminary data arising from this research and from tribal consultations indicate that tribal economic decision makers recognize the potential value of the horizontal sharing of financial information. The primary goal of the project is to provide an online financial information resource to tribal governments. Tribes will further benefit if organizations that service the tribal finance market are able to form a more complete understanding of the market. The TFIC will offer tribes and organizations servicing the tribal finance marketplace a web-based information system offering access to data sets that will reduce, if not eliminate, information asymmetry for tribal governments.

Several partners including the National Congress of American Indians (NCAI), the Native American Finance Officer’s Association, the National Intertribal Tax Alliance (NITA), the National Association of Bond Lawyers (NABL), and a number of the most economically successful tribes are working closely with the project team to stimulate broad cooperation by tribal governments. TFIC milestones achieved to date include:

- Creating a successful online TFIC prototype.
- Demonstrating the value of an e-government resource for tribal governments in commenting on proposed IRS rule changes.
- Collecting and disseminating original research on tax-exempt bonds finding that tribal tax-exempt bonds face a greater audit hazard risk than other governments.
- Consulting with tribal leaders to devise strategies to elicit voluntary contributions of financial information to a shared information resource.

In consultation with tribal leaders, the IRS, and supportive organizations, the TFIC project team developed a strategy to induce disclosure of IRS 8038 forms filed by tax-exempt bonds issuers. Tribal leaders suggest that building confidence in information sharing through limited

³ Online at <http://www.tribalfinance.org>.

disclosure about activities without direct competition in the marketplace is the most appropriate starting point. Tribal governments should benefit from a greater informational awareness about other issuers, and greater transparency should spur investors to compete to offer better terms to tribal governments.

Over the next 3 years, the TFIC project team will use a variety of techniques, including surveys, event history, and interviews to test hypotheses about information asymmetry and successful information sharing strategies. Specifically, the project team will determine (a) if differential information sharing practices create information asymmetry in the tribal finance marketplace, (b) if limited disclosure of low-risk financial information can catalyze additional and more granular inter-tribal information sharing, and (c) if using the TFIC can change perceptions about tribal economic development and investment opportunities including, but not limited to, tribes and their leaders. An information repository for a community of hundreds of tribes presents an unprecedented opportunity for academics, policy makers, and others to study an emerging market. Quite simply, there are research questions that will remain unanswerable until tribal governments begin sharing their knowledge and experiences.

5. Information asymmetry and law enforcement

The National Crime Information Center (NCIC) and the recently developed Global Justice XML Data Model (Global JXDM) provide evidence that information sharing among state and federal law enforcement entities continues to deepen. The April 2003 launch of the Global JXDM, an XML standard designed specifically for criminal justice information exchanges, promises to increase the sharing of justice data and information in a timely manner across a wide range of entities. We have found, however, that these information sharing efforts do not include tribal governments and that this vertical information asymmetry, coupled with questionable Supreme Court decisions, perpetuates domestic violence and child sexual abuse on Indian reservations at levels an order of magnitude greater than elsewhere.

5.1. *Vertical information asymmetry and domestic violence*

Indian women are victimized at astonishingly higher rates than the rest of society, primarily by non-Indian offenders.

- The Bureau of Justice Statistics found in 2004 that 86 of every 1000 American Indian females are victims of violence, 2.5 times the national average (Perry, 2004).
- BJS has consistently found that violent crime was “primarily interracial” for American Indian victims (Greenfeld & Smith, 1999; Perry, 2004; Rennison, 2001).
- Between 1992 and 2002, nearly 9 in 10 American Indian victims of rape or sexual assault were victimized by non-Indian assailants (Perry, 2004).

How did such an abhorrent situation arise, and why has it been allowed to continue? Part of the answer involves the history of criminal justice in Indian Country. The denial of tribal

jurisdiction over non-Indians is based primarily on the 1978 Supreme Court decision in *Oliphant v. Suquamish Indian Tribe*.⁴ Indian Country is the only place in America where both the race of the victim and the race of the offender matter in decisions about jurisdiction and prosecution (Clarkson, 2002). For violent crimes committed by non-Indian offenders since *Oliphant*, the tribe's only recourse is to refer the matter to the U.S. Attorney, who for a variety of reasons, often declines to prosecute. In 2002 the national average for declination of federal prosecution for sexual assault was more than 55% (USDOJ, 2004). Prosecution rates are especially important in the domestic violence context since the violent acts are more likely to be repeated than other types of assaults (MacKinnon, 2001).

No statistics document rates of declination of prosecution by U.S. Attorneys for such domestic violence on reservations, but the most recent data available shows that U.S. Attorneys declined to prosecute 27% of all crimes investigated in 2002 (USDOJ, 2004), and 40% of all violent offenses, including prosecution rates for crimes committed on and off the reservation. Even when U.S. attorneys are willing to prosecute cases of domestic violence committed against Indian women, the statutory hurdle is often so high that even breaking the victim's nose is insufficient grounds to secure a felony assault conviction under the federal definition that requires serious bodily injury (specific domestic violence charges do not exist).

Tribes do not have the capabilities to track referrals to federal prosecutors and thus are unable to measure rates of declination of prosecution or reasons for declination. The information asymmetries that exist involve justice data sharing, in particular, information about the disposition of a case such as a declination of prosecution. The federal prosecutor knows about every case involving non-Indian on Indian crime (as she has exclusive jurisdiction), and she also knows the disposition at the federal level. The tribal prosecutor knows about the case at the tribal level, but knows nothing about the disposition.

Even though information asymmetries are not the direct cause of these problems, tribes do not have the data about declination rates for non-Indian on Indian crimes, and thus they cannot make an informed decision about how to proceed. Since Congress exercises plenary authority over Indian tribes, tribes must bring their grievances to Congress in order to get them resolved, but absent data, Congress will continue to ignore this issue, as it has since 1978. Such vertical information asymmetries have prevented tribes from collecting the data necessary to advocate for a congressional remedy.

If the tribes had the data, they could determine whether (a) federal prosecutors are willing and able to prosecute but the statutory thresholds are too high for federal crimes; (b) federal prosecutors are understaffed and do not have the capacity to cover Indian Country adequately; (c) the problem is exaggerated; (d) federal prosecutors are just uninterested; or (e) some combination of the above.

The information poor tribes cannot obtain the necessary level of information to craft an appropriate response without the participation of the information-rich federal authorities, and thus the effectiveness of tribal participation in rectifying the shocking levels of domestic violence and child sexual assault is significantly curtailed. If tribes are unable to form a clear

⁴ 435 U.S. 191 (1978).

picture of the problem or agitate effectively for legislative changes, the problem of domestic violence will continue to plague Indian Country.

5.2. Vertical information sharing as a strategic response

Because of the complex jurisdictional realities involving three sovereigns and numerous law enforcement agencies, addressing the high incidence of domestic violence directed against Indian women and children will require vertical information sharing. In conversations with tribal prosecutors from several tribes, we have proposed the development of an Inter-Governmental Tracking System to facilitate vertical information sharing between tribal and federal prosecutors. Vertical information sharing should produce two desirable outcomes in the domestic violence context. First, it will permit greater insight into the decision-making processes among U.S. Attorneys that now result in high rates of declination of prosecution. The proposed system should generate empirical evidence to confirm what many scholars already suspect: U.S. Attorneys, with heavy caseloads and limited resources, are not giving domestic violence the attention the problem demands (Heisey, 1998; Holcomb, 1999). Second, in some instances U.S. Attorneys decline to prosecute because of a lack of available evidence to pursue felony assault charges. By strengthening information sharing among U.S. Attorneys and tribal judicial and law enforcement entities, tribes will be in a better position to produce and share the case information U.S. Attorneys need to pursue prosecution. Fig. 4 illustrates this vertical information sharing between tribal and federal prosecutors.

Recently, New Mexico and three Pueblo governments (Acoma, Laguna, and Zuni) announced a cooperative program intended to improve justice information sharing between tribal and state jurisdictions (Townsdin & Melton, 2004). In an information sharing effort that includes justice information, the Navajo Nation entered into negotiations for data sharing agreements with New Mexico, Arizona, and Utah and created the Navajo Nation Data Resource Center to “collect data, organize it, and make it available for use [and] to mediate between those that have the data and those who need the data” (National Resource Center for Child Welfare Data and Technology [NRC-CWDT], 2006). While both the Pueblo and Navajo programs indicate a desire for information sharing with federal authorities, to date, neither program has indicated that such efforts have succeeded.

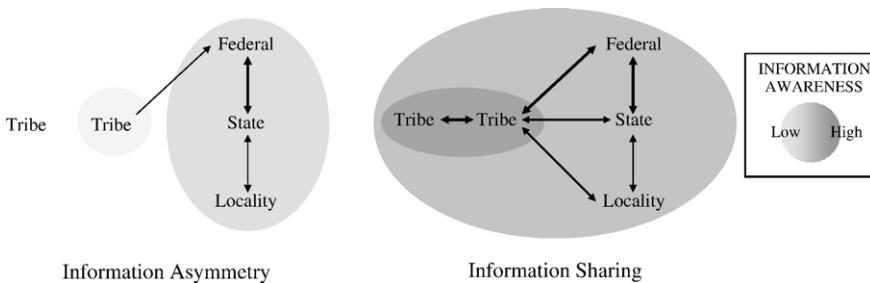


Fig. 4. Model of tribal horizontal and vertical information asymmetry and sharing.

6. Conclusion

As efforts succeed in removing the impediment of *access* to information technology, they may only uncover forms of information asymmetry that continue due to ingrained *practices* of information sharing. As shown in the tribal context, increased information sharing could help resolve information asymmetries impeding economic development and the prosecution of crimes in Indian Country. At the same time, poor informational awareness by tribes makes it difficult for them to demonstrate the cause and severity of their condition and coordinate responses. By selecting an information sharing response to a specific instance of information asymmetry based on whether that asymmetry is horizontal or vertical, tribes and entities assisting tribes can maximize the likelihood of alleviating the information asymmetry.

We believe our typology and models of information asymmetry are generally useful beyond the tribal context. In instances where a complete set of information exists among other underserved communities, including poor urban areas, remote rural communities, and other disadvantaged populations, these information poor entities could use the strategy of horizontal information sharing to increase their abilities to overcome the challenges to their communities (as in the tribal finance context). In instances where an information-rich entity has information that does not exist among the information poor (as in the domestic violence example), the information rich must participate in the sharing in order to rectify the information asymmetry. Other examples include financial disclosure for SEC registered entities as well as the availability of FOIA and similar state laws to enable citizens to obtain information from the government. Although in these instances, the information rich are compelled to provide information to the information poor, the information rich may also directly benefit from solving vertical information asymmetries, such as in the homeland security context. Thus, as in the tribal context, the directionality of the information asymmetry dictates the strategic response necessary for resolving the asymmetry.

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