

Conflict Between State Economic Development Policy and Federal Communications Policy Regarding NG9-1-1 and PSAPs

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I. INTRODUCTION	95
II. PUBLIC INTERESTS, LEGISLATION AND BUSINESS STRATEGIES	97
A. Non-Competing Interests and Emergency Communications Acts.....	97
B. Federal Communications Legislation of State 911 Systems....	98
C. Unnecessary Risk and Uncertainty for Business Strategies	99
III. TECHNOLOGY, POLICY AND PUBLIC INTERESTS OF NG9-1-1 SERVICES.....	101
A. Technology Affecting Types of 911 Calls	101
1. Impact of Technology on PSAPs and 911 Calls	101
2. Impact of Technology on NG9-1-1 Services.....	104
3. Impact of Technology on Persons and Routine Tasks....	104
B. Federal Communications Policy and NG9-1-1 Services.....	105
1. NG9-1-1 Services	105
2. ESInets and NPSBN.....	106
3. Stakeholders of Federal Communications Policy.....	108
C. Demands, Benefits and Costs of NG9-1-1 and PSAPs.....	109
1. Public Demands Causing Need for PSAP Services	110
2. Public Costs of NG9-1-1 Services and PSAPs Operations	110
3. Weighing Public Benefits and External Costs.....	112

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2023]	<i>HOLLOWAY</i>	95
IV. INVESTMENTS IN POLICY AND STRATEGIES INCREASING USE OF 911 CALLS		
	.....	113
A. Technology in Noncommunications Industries	.....	114
1. Challenges of Relying on Public Communications Infrastructure	.....	114
2. Personal Technologies Driving Public Safety Needs	....	115
3. Aligning Technology with Public Interests	.....	115
B. Technologies Advancing Public and Private Interests	.....	116
1. Internet of Things (IoT)	.....	116
2. Fifth Generation Cellular Networks (5G)	.....	118
3. Artificial Intelligence (AI)	.....	118
C. Investments in Communications Infrastructure and Economic Development	.....	120
1. Impetus for Investments in Making and Augmenting 911 Calls	.....	120
2. Public Investments in NG9-1-1 and PSAPs	.....	121
3. Private Investments to Advance Business Interests	.....	122
V. INDUSTRY PRODUCTS AND SERVICES RELYING ON NG9-1-1 AND PSAPs		
A. Health and Home Health Monitoring Products and Services	.....	123
1. Design of Home Health Monitoring Products and Service	.....	123
2. Impact of Technology on Industry	.....	124
3. Industry Demands on PSAPs	.....	125
B. Physical Security Products and Services	.....	126
1. Design of Physical Security Products and Services	.....	127
2. Impact of Technology on Industry	.....	127
3. Industry Demands on PSAPs	.....	128
C. Risk Management Products and Services	.....	129
1. Design of Risk Management Products and Services	.....	129
2. Impact of Technology on Industry	.....	130
3. Industry Demands on PSAPs	.....	131
VI. CONCLUSION		
	.....	132

I. INTRODUCTION

A subtle federal-state policy conflict exists between federal communications policy and state economic development policy involving government and business efforts reducing injuries, saving lives, and protecting property in emergencies, incidents and accidents occurring in homes, workplaces and schools. The cause of the conflict is Congress's long-standing refusal to enact federal communications

legislation appropriating funds¹ and establishing regulatory guidance² to fully implement internet-protocol (“IP”)-based emergency communications services and completely modernize 911 call center operations.³ These communications services and center operations are Next Generation (“NG”) 9-1-1⁴ services and Public Safety Answering Point (“PSAP”)⁵ operations, respectively. This conflict involves a mutual relationship between public emergency services and private health monitoring, residential security, and other products and services protecting the health, safety, and property of the American public. In retrospect, this communications policy and economic development policy conflict differs from the federal-state legal conflict regarding an exercise of power by state and federal governments in the same area or field of law, such as communications law.⁶ However, anything less than fully funding NG9-1-1 services and PSAP operations is insufficient and unnecessarily exposes the American public to unacceptable personal injuries, property damages, and loss of lives and a sector of American industry to unusual risk and uncertainty in planning and management to develop new products and services.

The article examines the federal-state policy conflict between federal communications policy and state economic development policy caused by Congress’s refusal to appropriate funds and establish regulatory guidance to implement NG9-1-1 services and modernize PSAP operations delivering all types of 911 calls and providing support and services to first responders and agencies. The Introduction, Part I, explained the existence, government interests, and public policy concerns of the federal-state policy conflict and its impact on state

¹ See Build Back Better Act, H.R. 5376, 117th Cong., 2d Sess., Title III, Subtitle J, § 31101 (as passed by US House of Representatives) (passed by the United States House of Representatives but Subtitle K was not enacted into law by the United States Senate); Spectrum Innovation Act of 2022, H.R.7624, 117th Cong., 2d Sess., Title III, § 301 (Jul. 2022) (as passed by the US House of Representatives, July 28, 2022 and sent to the U. S. Senate and referred by the Senate to the Committee on Commerce, Science, and Transportation on Jul. 28, 2022) [hereinafter “Spectrum Innovation Act”].

² See H.R. 5376, 117th Cong., §§ 31101–31103.

³ See H.R. 5376, 117th Cong., 2d Sess., Title III, Subtitle J, § 31104.

⁴ See 47 U.S.C. § 942(e)(5) (2022). Next Generation (NG) 9-1-1 services are an internet protocol (IP) based system that “processes all types of emergency calls, including voice, data, and multimedia information . . .” See 47 U.S.C. § 942(e)(5)(B) (2022) [hereinafter “NG9-1-1”].

⁵ 47 C.F.R. § 9.3 (2020) (defining a “Public Safety Answering Point or PSAP” as “[a]n answering point that has been designated to receive 911 calls and route them to emergency services personnel.”).

⁶ See James E. Holloway et al., *Federalism in the Financing of 911 Emergency Call Services: Nature of the Federal-State Funding Arrangement to Finance Next Generation (NG) 911 Services*, 5 CASE WESTERN J. TECH., L. & THE INTERNET, 125, 125–126 (2014).

2023]

HOLLOWAY

97

economic development policy urging business growth and other strategies. Part II explains the public need for Congress to enact communications legislation and the impact of Congress's delay or refusal on business strategies supporting state economic development policy by helping to protect health, property, and lives. Part III explains the technologies, federal communications policy, and public interests and costs affecting the implementation of NG9-1-1 services and modernization of PSAP operations. Part IV explains the role of technologies in noncommunication industries and private and public investments affecting business strategies and federal communication policy, respectively, supporting state economic development policy. Part V explains Congress's need to enact federal communications legislation fully implementing NG9-1-1 services and modernizing PSAP operations to support state economic development policy urging these industries to design, manufacture and market products and services making and augmenting 911 calls, data, and multimedia information. Part VI, the conclusion, states Congress must enact federal communications legislation appropriating funds and providing regulatory guidance to implement NG9-1-1 services and modernize PSAP operations to better support state economic development policy urging business growth and other strategies in risk management, health and home health monitoring, and physical security industries.

II. PUBLIC INTERESTS, LEGISLATION AND BUSINESS STRATEGIES

The federal and state interests of the federal communications policy and state economic development policy are not in the same field or area of law. These policies and their interests do not appear to be antagonistic or in opposition under federal constitutional law. Consequently, Congress should enact federal communication legislation appropriating funds and establishing regulatory guidance to implement NG9-1-1 services and modernize PSAP operations. This legislation directly supports state economic development policy urging business growth and other strategies in noncommunications industries needing full NG9-1-1 services and PSAPs operations. These industries manufacture products and perform services making and augmenting 911 calls, messages, data, and multimedia information and PSAP services and support delivered to first responders and agencies through NG9-1-1 services and by PSAP operations.

A. Non-Competing Interests and Emergency Communications Acts

The public interests of federal communications policy and state economic development policy are under different laws of federal and

state statutes.⁷ Federal communication policy establishes NG9-1-1 services and PSAP operations to further communications and public safety interests of saving lives, reducing personal injuries, and protecting private property.⁸ In the states, economic development policy advances uniquely state economic and social interests by urging business growth and other strategies to create jobs, raise tax revenues, and advance community growth.⁹ However, state economic development policy also relies heavily on the support of persons and organizations furthering primarily business or private interests to expand product and service markets and increase profits.¹⁰ Thus, federal communications policy and state economic development policy do not conflict by operating in the same field or area of federal law to further their respective interests.

B. Federal Communications Legislation of State 911 Systems

State NG9-1-1 services and PSAP operations are not new to enactments of federal communications legislation protecting safety, property and life. On several occasions, Congress enacted federal communications legislation to establish 911 calls, address the impact of technology on 9-1-1 calls, and provide funds and regulatory guidance to implement Enhanced (“E”) 9-1-1 services,¹¹ plan for implementing NG9-1-1 services, and improve PSAP operations.¹² Congress is well aware

⁷ Compare Communications Act, 47 U.S.C. § 152(a) (2023) (“The provisions of this act shall apply to all interstate and foreign communication by wire or radio and all interstate and foreign transmission of energy by radio, . . .”), with N. C. Gen. Stat. § 158-7.1 (2023) (“Each county and city in this State is authorized to make appropriations for economic development purposes. . .”).

⁸ See 47 U.S.C. § 615 Note (Findings and Purpose) (2020) (“[E]nd-to-end communications infrastructure among members of the public, emergency safety, fire service . . . will reduce response times for the delivery of emergency care, assist in delivering appropriate care, and thereby prevent fatalities . . .”).

⁹ See INT’L ECON. DEV. COUNCIL, ECONOMIC DEVELOPMENT REFERENCE GUIDE 3 (last visited Oct. 8, 2023), <https://edpbestpractices.com/wp-content/uploads/GL-Uploads/General-ED-Resources/IEDC-ED-Reference-Guide.pdf>.

¹⁰ *Id.*

¹¹ 47 U.S.C. § 615 (b)(10) (“The term ‘enhanced 9–1–1 service’ means the delivery of 9–1–1 calls with automatic number identification and automatic location identification, or successor or equivalent information features over the wireline E911 network . . .”).

¹² See NG9-1-1 Advancement Act, Pub. L. No. 112-96, 126 Stat. 156, 237 (2012), Subtitle E, §§ 6501–6509 (2012) (codified in scattered parts of 47 U.S.C.) [hereinafter NG9-1-1 Advancement Act]; Middle-Class Tax Relief and Job Creation Act of 2012, Pub. L. 112-96, 126 Stat. 156 (2012) (codified in scattered parts of 47 U.S.C.) [hereinafter Middle-Class Tax Relief Act]; New and Emerging Technologies 911 Improvement Act of 2008, Pub. L. No. 110-283, 122 Stat. 2620 (2008) (codified in scattered parts of 47 U.S.C.) [hereinafter “NET 911 Improvement Act of 2008”]; Ensuring Needed Help Arrives Near Callers Employing 911 Act of 2004, Pub. L. No. 108-494, 118 Stat. 3986 (2004) (codified

2023]

HOLLOWAY

99

that NG9-1-1 services and PSAP operations must include personal, public safety, and other technology development of the communications industry to transmit more than 911 voice calls.¹³ In fact, NG9-1-1 services and PSAP operations must eventually respond to the use of 911 Apps, monitoring devices, physical security services, and other technology development making and augmenting 911 calls delivered to PSAPs notify and support first responders.¹⁴ Therefore, Congress must enact federal communications legislation appropriating funds and establishing regulatory guidance to implement NG9-1-1 services and modernize PSAP operations to protect communications and public safety interests.

C. Unnecessary Risk and Uncertainty for Business Strategies

This conflict is problematic because Congress's refusal to enact appropriate legislation delays planning and management of business growth, development, and entrepreneurial strategies needed to fully design, manufacture, and market products and services making and augmenting 911 calls using NG9-1-1 services and PSAP operations. Congress must ascertain and weigh the extent of the effects of NG9-1-1 services and PSAP operations on state economic development policy urging noncommunications industries to develop business growth and other strategies. In this article, these industries include health and

in scattered parts of 47 U.S.C.) [hereinafter ENHANCE 911 Act]; Wireless Communications and Public Safety Act of 1999, Pub. L. 106-81, 112 Stat. 1286 (1999) (codified in scattered parts of 47 U.S.C.) [hereinafter Wireless Communications Act].

¹³ See NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. & NAT'L TELECOMM. AND INFO. ADMIN., NEXT GENERATION 911 COST ESTIMATE, A REPORT TO CONGRESS 12 (2018), https://www.911.gov/assets/Next_Generation_911_Cost_Estimate_Report_to_Congress_2018.pdf [<https://perma.cc/YV3R-KXCZ>] [hereinafter NG9-1-1 COST ESTIMATE REPORT].

¹⁴ See Kaofeng Lee, *Need to Call 911? There's an App for That!*, TECHSAFETY.ORG, <https://www.techsafety.org/blog/2016/8/25/need-to-call-911-theres-an-app-for-that> (Aug. 26, 2016) [hereinafter K. Lee] (recognizing that the 911 Apps deliver the call to an operator who calls PSAPs); See NAT'L PUB. SAFETY TELECOMM. COUNCIL, *FirstNet and Next Generation 9-1-1: High Level Overview of Systems and Functionality*, at 1 (Jun. 29, 2015),

http://npstc.org/download.jsp?tableId=37&column=217&id=3465&file=NG911_Outreach_Report_2015_0629_FINAL.pdf, [hereinafter NAT'L PUB. SAFETY TELECOMM. COUNCIL] (recognizing that 911 calls could be generated by machines and sensors to send data and messages).

home health monitoring,¹⁵ physical security,¹⁶ and risk management.¹⁷ They can support state economic development policy by using business growth,¹⁸ development,¹⁹ and entrepreneurial²⁰ strategies, such as building new or expanding old manufacturing facilities and home security service centers.²¹ Thus, Congress's refusal means these industries cannot manufacture products and create services using NG9-1-1 services and PSAP operations to make and augment 911 calls and reduce the delivery time to and response time by first responders protecting persons, employees, and school children from death, injury, and harm.

State economic development policy needs NG9-1-1 services and PSAP operations to urge these industries the use their technological capacities, market expectations, social awareness, and managerial capabilities to create more jobs and increase tax revenues.²² Fully implementing NG9-1-1 networks²³ and modernizing PSAP services will

¹⁵ Aine Cryts, *Remote Health Monitoring: Real-time Connections Add Value*, MANAGED HEALTHCARE EXEC., at 16, 17 (July 2020) (explaining the uses by and benefits to health care providers and individuals of remote home health monitoring).

¹⁶ See Anthony Maier, *What We Have Here Is a Failure to Communicate*, NAT'L UNDERWRITER PROP. & CAS./RISK & BENEFITS MGMT., 24–25 (Aug. 6, 2001) (discussing the use of Enhanced (E) 911 service to deliver 911 voice calls).

¹⁷ See Maier, *supra* note 16, at 24 (finding that risk management is implicated in "safety issues and hazards . . .").

¹⁸ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 4 (recognizing that business growth includes supporting and retaining small businesses).

¹⁹ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 50 (finding that business development includes attracting and growing small business organizations).

²⁰ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 19 (finding business entrepreneurship includes starting new businesses).

²¹ See INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 3 (stating that "economic development [includes] improving the business climate through . . . business finance, marketing . . . , business retention and expansion, technology transfer, real estate development and others."); Timothy J. Bartik, *Rethinking State Economic Development Strategies: Or, How to Maximize Benefits for State Residents' Earnings Per Capita*, W.E. UPJOHN INST. FOR EMP. RSCH., at 2 (Dec. 18, 2019), <https://research.upjohn.org/cgi/viewcontent.cgi?article=1062&context=presentation> (recognizing that state and local governments give business organizations incentives to locate in their states and communities).

²² See INT'L ECON. DEV. COUNCIL, *supra* note 9, at 56 (finding that technology development includes development of new products and services). Moreover, state legislation can lawfully urge county and municipal governments to further or advance economic development opportunities by offering incentives to business organizations. See *Maready v. City of Winston-Salem*, 467 S.E.2d 615, 624–25 (N.C. 1996).

²³ See *ESInet (Emergency Services IP Network)*, NENA KNOWLEDGE BASE (Nov. 1, 2022), <https://nenawiki.org/wiki/ESInet> (noting that local public safety agencies and divisions can share an Emergency Services IP Network (ESInet)); SERENA CHAN & MICHAEL T. HERNON, DEPARTMENT OF THE ARMY: CLOSING THE NEXT GENERATION 9-1-1 CAPABILITY GAP 4-2

allow these industries more certainty in planning and managing strategies for business growth, development and entrepreneurship, and creating mutually supportive industrial goals at the urging of state economic development policymakers. The refusal of Congress, however, to appropriate funds and provide regulatory guidance for NG9-1-1 services and PSAP operations adds uncertainty and risk to planning and managing and creating mutually beneficially goals by business organizations of health and home health, physical security, and risk management industries.

III. TECHNOLOGY, POLICY AND PUBLIC INTERESTS OF NG9-1-1 SERVICES

The communications technology of NG9-1-1 services is an IP-based system that allows PSAPs to deliver 911 calls, data, and multimedia information to first responders and agencies. Other technologies allow persons and industries to make greater use of NG9-1-1 services and PSAP operations to protect the public from harm, injuries, and hazards. In addition, federal communications policy needs to include regulatory guidance to support state NG9-1-1 services and county and municipal PSAP operations. Furthermore, government agencies and private organizations play essential roles in communications policymaking to implement NG9-1-1 services and modernize PSAP operations.

A. Technology Affecting Types of 911 Calls

Communications and other technologies play quintessential roles in establishing NG9-1-1 networks and providing PSAPs services and support in receiving and delivering 911 calls, data, and multimedia information. NG9-1-1 services receive and deliver voice and other types of 911 calls to PSAPs for transmission to first responders, such as law enforcement and emergency medical services. Other technologies can make or augment 911 calls, data, and multimedia information using products and services of health and home health monitoring, physical security, and risk management industries.

1. Impact of Technology on PSAPs and 911 Calls

Communications and noncommunications technologies can affect PSAP operations by making and augmenting 911 calls and requiring PSAPs to provide more services and support to first responders and agencies. These technologies are fifth generation cellular networks

(2019), <https://www.jstor.org/stable/resrep22902.7?seq=1> (noting that state and federal funds pay for deployment of ESInets).

(5G),²⁴ the wireless Nationwide Public Safety Broadband Network (NPSBN),²⁵ internet of things (IoT),²⁶ and artificial intelligence (AI).²⁷ IoT, 5G, and AI technologies can affect the design of physical security, monitoring and other products and services transmitting data and multimedia information through NG9-1-1 networks for delivery as 911 calls.²⁸ In addition, PSAPs deliver 911 calls, data, and multimedia information²⁹ through the NPSBN to first responders and agencies,³⁰ and PSAPs also receive 911 calls, data and multimedia information from

²⁴ See Heejung Yu et al., *What is 5G? Emerging 5G Mobile Services and Network Requirements*, 9 SUSTAINABILITY at 2–3 (2017) (finding technology development supports economic development and community development) [https://doi.org/10.3390/su9101848].

²⁵ See Middle-Class Tax Relief Act, H.R. 3603, 112th Cong., Title VI, §§ 6001–6414 (delegating authority to the National Telecommunications and Information Administration (NTIA) to establish the National Public Safety Broadband Network (“NPSBN”)); NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2–3 (explaining the purpose of the NPSBN and its relationship to NG9-1-1 services and PSAP operations).

²⁶ See William H. Dutton, *Putting Things to Work: Social and Policy Challenges for The Internet of Things*, J. OF POL’Y, REG. & STRATEGY FOR TELECOMM., INFO., AND MEDIA, March 2014, at 2–3 (explaining the uses and benefits of the internet of things (IoT) and its impact on communications and other systems) [https://doi.org/10.1108/info-09-2013-0047]; NENA IMPACT OF IOT DEVICES AND EMERGENCY CALLING APPLICATIONS INFORMATION DOCUMENT, NAT’L EMERGENCY. NO. ASS’N 7 (Aug. 19, 2020), https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/nena-inf-030.1-2020_iot_&_ap.pdf [https://perma.cc/W9AD-RVL3] [hereinafter NENA IMPACT OF IOT].

²⁷ David F. Jacobs & Fleming E. Keefe, *Attorney’s Guide to AI Primer: A Practicing Attorney’s Guide to Artificial Intelligence*, THE JAG REPORTER 1 (Oct. 27, 2021), https://www.jagreporter.af.mil/Portals/88/2021%20Articles/Documents/20211027%20Jacobs.pdf?ver=PbFQ-cRACKd2vxyinxiGVg%3D%3D (citing Greg Allen, *Understanding AI Technology*, JAIC, DEP’T OF DEF. 1 (2020), https://www.ai.mil/docs/Understanding%20AI%20Technology.pdf.); Rex Martinez, Note, *Artificial Intelligence: Distinguishing Between Types & Definitions*, 19 NEV. L.J. 1015, 1020 (2019).

²⁸ See 47 U.S.C. § 942(e)(5)(B) & (D) (2020) (stating that NG9-1-1 “processes all types of emergency calls, including voice, data, and multimedia information . . .”); see also FEDERAL COMMUNICATIONS COMMISSION, FCC 14-118, IN THE MATTER OF FACILITATING THE DEPLOYMENT OF TEXT-TO-911 AND OTHER NEXT GENERATION 911 APPLICATIONS AND FRAMEWORK FOR NEXT GENERATION 911 DEPLOYMENT: SECOND REPORT AND ORDER AND THIRD FURTHER NOTICE OF PROPOSED RULEMAKING, 6 (Aug. 8, 2014), https://www.911.gov/assets/Facilitating-the-Deployment-of-Text-to-911-and-Other-Next-Generation-Applications-1638566444.pdf (requiring carriers to provide 911 text messages to PSAPs.).

²⁹ Neeraj K. Gupta et al., *Next Generation 9-1-1: Architecture and Challenges in Realizing an IP-Multimedia-Based Emergency Service*, J. OF HOMELAND SEC. AND EMERGENCY MGMT 1, 9 (Dec. 29, 2010) (finding that “[t]he NG-9-1-1 system will have inputs from several sources simultaneously for the same emergency call—video, text, or sensor data in addition to voice. . .”).

³⁰ NAT’L 911 PROGRAM, *NG911 Roadmap: Pathways Toward Nationwide Interconnection of 911 Services*, 1 (2019), https://www.911.gov/assets/NG911_Roadmap_Final.pdf [hereinafter *NG911 Roadmap*] (finding faster responses and other 911 benefits in nationwide interoperability 911).

persons with disabilities.³¹ The 911 calls may require PSAPs to perform interpretive and other services and provide command support to first responders and agencies.³² In sum, technology will place greater demands on PSAPs and their staff to receive and deliver all types of 911 calls and respond to requests by first responders for interpretive and other services and support.

The technology development of IoT, 5G, and AI can greatly affect the making and augmenting of 911 calls requesting emergency medical and public safety services. Technology development creates the impetus for business growth and other strategies to support state economic development policy. For example, IoT can connect sensors, monitors, and other devices to collect, store, and share data and can transmit these data and multimedia information as emergency 911 calls to PSAPs.³³ Technology development should be used in state economic development policy and not limited by Congress's refusal to appropriate funds to implement NG9-1-1 services and modernize PSAP operations.³⁴ Communications technology development is using IP-based technology systems to support federal communications policy to implement NG9-1-1 services and modernize PSAP operations to deliver 911 calls, data, and multimedia information. Thus, communications technology development extends support to state economic development policy that urges these industries to develop monitoring devices, alarms, and other products and services improving delivery of 911 calls to request emergency medical and public safety services.

³¹ See Elizabeth Chance et al., *Summary of the Legal and Policy Landscape Surrounding Accessibility and 911*, U. OF COLO. SAMUELSON-GLUSHKO TECH. L. & POL'Y CLINIC 1, 1 (Apr. 30, 2015) (giving a summary of regulation covering emergency communications of person with hearing and speech disabilities) [<http://dx.doi.org/10.2139/ssrn.2601042>]; R. Barnes & B. Rosen, *911 for the 21st Century*, IEEE SPECTRUM, 58, 63 (Apr. 2014) (finding that NG9-1-1 provides access and more support for persons with disabilities) [<https://doi.org/10.1109/MSPEC.2014.6776307>].

³² *NG911 Roadmap*, *supra* note 30, at 1 (recognizing that faster response time allows first responders to do more at emergencies); 47 U.S.C. § 942(e)(5)(E) (2020) (NG9-1-1 services "supports data or video communications needs for coordinated incident response and management[.]"); Barnes & Rosen, *supra* note 31, at 63 (finding that NG9-1-1 networks can transmit more data).

³³ See Dutton, *supra* note 26, at 2–3 (explaining IoT can impact communications and other technologies by sharing, storing and sending data); see also Amit Kishor & Chinmay Chakraborty, *Artificial Intelligence and Internet of Things Based Healthcare 4.0 Monitoring System*, WIRELESS PERS. COMM., 1615 (July 3, 2021), (describing the use of AI and IoT in the healthcare industry to predict diseases) [<https://doi.org/10.1007/s11277-021-08708-5>].

³⁴ See H.R. 5376, 117th Cong. §§ 31101–31104 (2021) (as passed by U.S. House of Representatives on Nov. 19, 2021, but not passed by the U.S. Senate.).

2. Impact of Technology on NG9-1-1 Services

Communications, consumer, and other technologies are driving the implementation of NG9-1-1 that converges with NPSBN at PSAPs.³⁵ NG9-1-1 services include Emergency Services IP Networks (ESInets) to transmit 911 calls to 911 telecommunicators and other PSAP staff for delivery to first responders and agencies.³⁶ An ESInet “is a managed IP network that is used for emergency services communications and can be shared by all public safety agencies.”³⁷ An ESInet “provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services”³⁸ However, NG9-1-1 services are slowly following the implementation of the federally owned and privately operated NPSBN. As ESInets deliver 911 calls, data, and multimedia information to PSAPs, the NPSBN allows PSAPs to deliver 911 calls, data, and multimedia information to first responders and agencies.³⁹ In addition, NPSBN also allows first responders to request interpretive services and command and other support from PSAPs.⁴⁰ Thus, ESInets and NPSBN give 911 callers the ability make all types of 911 calls and allow PSAPs to respond to request for services and support by first responders and agencies.

3. Impact of Technology on Persons and Routine Tasks

Personal and other technologies allow NG9-1-1 networks and PSAP services to impact tasks performed within PSAPs to aid 911 telecommunicators receiving and without PSAPs to aid persons making or augmenting 911 calls with data, video, and photographs. Fourth-generation wireless (4G) Long Term Evolution (LTE) technology is still

³⁵ See Stephanie Kanowitz, *The Consumer Electronics That Power Public Safety*, GCN (Jan. 26, 2018), <https://gcn.com/data-analytics/2018/01/the-consumer-electronics-that-power-public-safety/298881>.

³⁶ See *Functional and Interface Standards for NG 9-1-1 (i3)*, NAT'L EMERGENCY NO. ASS'N (Dec. 18, 2007) https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards-archived/vena_08-002_archived_may_202.pdf [hereinafter NENA - Interface Standards] (introducing the relationship between NENA i3 Standards and ESInets); NAT'L EMERGENCY NO. ASS'N, NENA DETAILED FUNCTIONAL AND INTERFACE STANDARDS FOR THE NENA i3 SOLUTION 14 (2016), https://www.oregon.gov/oem/Documents/NENA-FIS_for_i3_Solution.pdf [hereinafter NENA i3 SOLUTION] (explaining the operations and architecture of the NENA i3 Solution in providing NG9-1-1 services).

³⁷ NENA KNOWLEDGE BASE, *supra* note 23.

³⁸ NENA KNOWLEDGE BASE, *supra* note 23.

³⁹ NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2 (explaining the purpose of the National Public Safety Broadband Network); NG9-1-1 Roadmap, *supra* note 30, at 25 (defining multimedia information as “e.g., images, real-time text, social media, [and] videos”).

⁴⁰ NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

widely used and allows “people . . . to experience broadband services with their mobile devices (e.g., smart phones and tablet PCs) . . .”⁴¹ However, the 5G cellular networks are more capable,⁴² and these networks “can be developed in several directions such as unlimited data transmission, a massive number of active connections and new types of mobile devices . . .”⁴³ Next, artificial intelligence (AI) can impact the use of NG9-1-1 services and PSAP operations by learning to perform routine tasks. “AI can be defined as ‘the ability [of machines] to perform tasks that normally require human intelligence.’”⁴⁴ Finally, AI can be used with IoT “to make more efficient uses of vast amounts of data collected by IoT devices.”⁴⁵ AI and IoT are a combination that can support business growth and other strategies for economic development in these industries. Thus, the capabilities of AI, 5G, and IoT and their combinations can greatly impact PSAPs and their support of and services to first responders and agencies.⁴⁶

B. Federal Communications Policy and NG9-1-1 Services

IP-based communications technology expands the types of 911 calls used to request emergency services and allows PSAPs to provide services and support to first responders and agencies. NG9-1-1 services are an IP-based communications system that delivers 911 calls to PSAPs. Next, PSAPs use NPSBN to transmit or deliver 911 calls and provide PSAP services and support to first responders and agencies. Government agencies and public and private organizations engage in shaping federal communications policy to implement NG9-1-1 services and modernize PSAP operations by Congress’s enactment of federal communications legislation.

1. NG9-1-1 Services

Section 6503 of the NG9-1-1 Advancement Act of 2012⁴⁷ defines and lists the capabilities of NG9-1-1 services that use IP-based technology to deliver 911 calls to PSAPs. Section 6503 defines NG9-1-1 services as follows:

⁴¹ Yu et al., *supra* note 24, at 1.

⁴² Yu et al., *supra* note 24, at 1.

⁴³ Yu et al., *supra* note 24, at 1.

⁴⁴ Jacobs & Fleming, *supra* note 27, at 1 (citing Greg Allen, *Understanding AI Technology*, Apr. 2020, <https://www.ai.mil/docs/Understanding%20AI%20Technology.pdf>).

⁴⁵ See Kishor & Chakraborty, *supra* note 33, at 1615 (describing the use of AI and IoT in the healthcare industry to predict diseases).

⁴⁶ 47 U.S.C. § 942(e)(5)(E) (2022).

⁴⁷ Pub. L. No. 112-96, 126 Stat. 156, 237 (2012), Subtitle E, §§ 6501-6509 (2012).

(5) Next Generation 9-1-1 services. The term “Next Generation 9-1-1 services” means an IP-based system comprised of hardware, software, data, and operational policies and procedures that—

- (A) provides standardized interfaces from emergency call and message services to support emergency communications;
- (B) processes all types of emergency calls, including voice, data, and multimedia information;
- (C) acquires and integrates additional emergency call data useful to call routing and handling;
- (D) delivers the emergency calls, messages, and data to the appropriate public safety answering point and other appropriate emergency entities;
- (E) supports data or video communications needs for coordinated incident response and management; and
- (F) provides broadband service to public safety answering points or other first responder entities.⁴⁸

NG9-1-1 networks are normally state communications infrastructure delivering all types of 911 calls to PSAPs.⁴⁹ PSAPs are governed by state communications legislation⁵⁰ and, usually, are owned and operated by counties and municipalities.⁵¹ Finally, PSAPs deliver 9-1-1 calls, data, and multimedia information to agencies and first responders that respond to incidents, accidents, and emergencies.

2. ESInets and NPSBN

Within NG9-1-1 services, ESInets⁵² allow “PSAPs ... to provide interconnection ... to other ESInets, originating service providers, third-party data providers, ... [t]elematics providers, groups of agencies and 9-1-1 service providers ... within a city, county, state or larger

⁴⁸ 47 U.S.C. § 942(e)(5) (2022).

⁴⁹ See, e.g., N.C. Gen. Stat. § 143B-1401 (2022); VA Code Ann. § 56-484.16(G) (2023).

⁵⁰ See, e.g., N.C. Gen. Stat. § 143B-1401 (2022) (listing the duties of NC 911 Board that implements NG9-1-1 policy in the state of North Carolina); 63 Okl. St. Ann. § 2864 (2023) (listing duties of the Oklahoma 9-1-1 Management Authority that implements NG9-1-1 in the state of Oklahoma).

⁵¹ See, e.g., N.C. Gen. Stat. § 143B-1406(h) (2022) (“Every local government shall participate in a 911 system”); N.C. Gen. Stat. § 143B-1406(f)(6) (“A primary PSAP must comply with the rules, policies, procedures, and operating standards for primary PSAPs adopted by the 911 Board”).

⁵² See NENA I3 SOLUTION, *supra* note 36 (listing NENA standards for the operation of NG9-1-1 networks); NAT’L EMERGENCY NO. ASS’N, EMERGENCY SERVICES IP NETWORK DESIGN INFORMATION DOCUMENT 6 (2018), https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/NENA-INF-016.2-2018_ESIND_20.pdf [hereinafter NENA-IP NETWORK DESIGN] (allowing PSAPs to make connections with first responders and agencies).

2023]

HOLLOWAY

107

regional system via Internet Protocol (IP) networks, . . .”⁵³ ESInets deliver 911 calls to PSAPs that use NPSBN to transmit or deliver 911 calls to first responders, emergency management, and other agencies.⁵⁴ NPSBN converges with NG9-1-1 services at PSAPs⁵⁵ where 911 calls are transmitted through NPSBN to first responders and agencies.⁵⁶ The NPSBN is owned by the federal government⁵⁷ and managed by the federal First Responders Network Authority (FirstNet).⁵⁸ AT&T operates the NPSBN on behalf of FirstNet to support public safety and emergency services.⁵⁹ FirstNet provides “20 MHz of high-value, telecommunications spectrum and success-based payments of \$6.5 billion over the next five years . . .”⁶⁰ Over 25-year life of the contract, “AT&T will spend about \$40 billion . . . to build, deploy, operate and maintain the network . . . and . . . connect FirstNet users to the company’s telecommunications network assets . . .”⁶¹ Thus, NG9-1-1 services and NPSBN are essentially IP and wireless, respectively, networks that allow PSAPs to receive 911 calls and deliver these calls to first responders and agencies.

⁵³ NENA-IP NETWORK DESIGN, *supra* note 52, at 6.

⁵⁴ See 47 U.S. C § 1424(a) (2020).

⁵⁵ See Kristi Wilde, *Integrating FirstNet into 911 Operations* (Sept. 16, 2019), <https://firstnet.gov/newsroom/blog/integrating-firstnet-911-operations> (explaining the benefits of the NPSBN to PSAPs and first responders).

⁵⁶ MISSION CRITICAL PARTNERS, HARNESING NG911 AND NPSBN 1 (2017), <https://cdn2.hubspot.net/hubfs/2385785/White%20papers/The%20Technical%20Evolution%20of%20the%20PSAP%20in%20a%20NG911%20and%20FirstNet%20Environment.pdf?t=1527092913903>; Dave Schnert, *When It Comes To FirstNet and NG911 Convergence is the Key to Success* (Oct. 25, 2017), <https://resources.missioncriticalpartners.com/insights/firstnet-and-ng911-convergence-the-new-public-safety-communications-platform>.

⁵⁷ 47 U.S. C § 1424(a) (2020) (establishing FirstNet to implement the privately operated NPSBN to transmit or deliver calls and data from PSAPs to first responders and government agencies).

⁵⁸ See 47 U.S. C § 1424(a) (2020) (establishing the First Responder Network Authority (FirstNet) to implement the NPSBN).

⁵⁹ *FirstNet Partners with AT&T to Build Wireless Broadband Network for America’s First Responders*, FIRSTNET (Mar. 18, 2017), <https://2014-2018.firstnet.gov/news/firstnet-partners-att-build-wireless-broadband-network-americas-first-responders> (hereinafter *FirstNet-Partners*).

AT&T is also expected to complete the NPSBN by the end of five-year period that began in 2018. AT&T has completed or built out 80 percent of NPSBN and enrolled 1.2 million subscribers. Donny Jackson, *FirstNet buildout 80% complete, serves 1.2 million subscribers, AT&T exec says*, URGENT COMMUNICATIONS (Mar. 12, 2020), <https://search.proquest.com/docview/2376279669/CD2A97BE25344654PQ/29?accountid=10639>, (finding that AT&T will allow NPSBN access to 5G coverage).

⁶⁰ *FirstNet-Partners*, *supra* note 59.

⁶¹ *FirstNet-Partners*, *supra* note 59.

3. Stakeholders of Federal Communications Policy

Business growth and other strategies of economic development exist in the communications and telecommunications industries.⁶² The communications and telecommunications⁶³ industries construct NG9-1-1 networks, install PSAP equipment,⁶⁴ and operate the government-owned NPSBN.⁶⁵ These industries install, construct, and manage the implementation of NG9-1-1 services and modernization of PSAP operations.⁶⁶ AT&T, Mission Critical Partners and other business organizations install or consult on the installation of NG9-1-1 technologies and PSAP operating equipment.⁶⁷ Thus, the communications and telecommunications industries support economic development by installing and constructing communications infrastructure, such as NPSBN, NG9-1-1 services and PSAP operations.

Government agencies are stakeholders in implementing NG9-1-1 service and modernizing PSAP operations in receiving 911 calls from persons and delivering 911 calls to first responders. These agencies are the National Telecommunications and Information Administration (NTIA), Public Safety Communications Research Program (PSCRP), United States Department of Homeland Security (DHS), Federal Communications Commission (FCC), First Network Advisory Authority

⁶² See, e.g., FirstNet-Partners, *supra* note 59 (explaining the role AT&T in developing and implementing the NPSBN); see also MISSION CRITICAL PARTNERS, *supra* note 56, at 1 (identifying an organization participating in implementing NG9-1-1 services and modernizing PSAPs).

In addition, FirstNet states that the impact of economic development caused by NPSBN will equal to 10,000 jobs. See FirstNet-Partners, *supra* note 59.

⁶³ The Telecommunications Act of 1996 amended parts of the Communications Act of 1934, 47 U.S.C. § 153 *et. seq.*, and defines telecommunications as “transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.” 47 U.S.C. § 153. The Telecommunications Act of 1996 defines telecommunications services as “the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.” § 153.

⁶⁴ See MISSION CRITICAL PARTNERS, *supra* note 56, at 4 (“Mission Critical Partners is a professional services firm that helps clients enhance and evolve their public safety systems and operations through extensive experience, knowledge and resources.”); *NG9-1-1 Roadmap*, *supra* note 30, at 11 (listing the following types of industries in implementing NG9-1-1 and modernizing PSAPs: “Telecommunications carriers[,] Network service providers[,] CAD vendors[,] Customer premises equipment (CPE) vendors[,] and Telematics providers.”).

⁶⁵ FirstNet Partners, *supra* note 59 (explaining the commercial role of AT&T, a business organization of the communications industry, in developing, deploying, and implementing the NPSBN).

⁶⁶ See *NG911 Roadmap*, *supra* note 30, Appendix 2.

⁶⁷ See *NG911 Roadmap*, *supra* note 30, Appendix 2.

(FirstNet), and United States Department of Justice (DOJ)).⁶⁸ Although these agencies have different regulatory authority under federal communications legislation governing NG9-1-1 services and PSAP operations, the Build Back Better Bill appears to increase the regulatory authority of NTIA over NG9-1-1 services.⁶⁹ The Build Back Better Bill would have granted NTIA the authority to guide and coordinate implementing, operating, and maintaining NG 9-1-1 services.⁷⁰ In providing more regulatory guidance, the Build Back Better Bills would have established an NG 9-1-1 Cybersecurity Center “to coordinate . . . the sharing of cybersecurity information about, the analysis of cybersecurity threats to, and guidelines for strategies to detect and prevent cybersecurity intrusions”⁷¹ Thus, federal regulatory stakeholders implement federal communications policy to advance the implementation of NG9-1-1 services and modernization of PSAP operations.

Private organizations are also stakeholders in the implementation of NG-9-1-1 operations and the modernization of PSAP operations. These organizations and related industries include, among others, the Association of Public-Safety Communication Officials, Industry Council for Emergency Response Technologies, International Academies of Emergency Dispatch, National Association of State 911 Administrators, National Center for Missing and Exploited Children, National Emergency Number Association, Next Generation 911 Institute, and National 911 Education Coalition.⁷² These organizations represent public safety employees, address public needs and provide technical advice and guidance to federal and state agencies on the implementation of NG9-1-1 services and modernization of PSAP operations.⁷³

C. Demands, Benefits and Costs of NG9-1-1 and PSAPs

Health and home health monitoring, physical security, and risk management industries can protect persons, reduce injuries, and secure property using cameras, alarms, and monitoring services. These devices and services are also capable of making and sending one or more types of 911 calls through private emergency operators to PSAPs, or directly to 911 telecommunicators at PSAPs. These types of 911 calls, data and

⁶⁸ See *NG911 Roadmap*, *supra* note 30, Appendix 2.

⁶⁹ H.R. 5376, 117th Cong., §§ 31101-31103.

⁷⁰ *Id.*

⁷¹ *Id.* at § 31102.

⁷² *NG911 Roadmap*, *supra* note 30, at Appendix 2.

⁷³ See *NG911 Roadmap*, *supra* note 30, at 1 (recognizing the efforts of public and private stakeholders to implement NG9-1-1 services and modernize PSAPs).

multimedia information impose service, support, and call demands on maintaining and operating PSAP operations and impose costs on NG9-1-1 services and networks. Finally, federal, state, county, and municipal policymakers must remain cognizant of these demands and external costs that might be imposed on NG9-1-1 services and PSAP operations by these industries.

1. Public Demands Causing Need for PSAP Services

The 911 calls made by alarms and other devices, or private operators can place a greater demand on PSAPs to use more services, time, and support to assist first responders. Private operators may review and send 911 calls, data, and multimedia information to 911 telecommunicators.⁷⁴ Physical security and health monitoring industries may design consumer products and services to deliver data and multimedia information to augment 911 calls and offer more services and support to first responders and agencies.⁷⁵ An example is the delivery of personal data for use by law enforcement agencies and emergency medical services (EMS).⁷⁶ The delivery of 911 data and multimedia information and requests for PSAP services and support are public benefits limiting or minimizing disruptive effects of injuries in homes and workplaces. Thus, alarms, monitoring devices, and other products and services make greater financial, technical, and operational demands on NG9-1-1 services and PSAP operations, such as PSAP staff and NG9-1-1 network bandwidth.⁷⁷

2. Public Costs of NG9-1-1 Services and PSAPs Operations

The 911 calls and requests for PSAP services and support can affect federal, state, and local costs of providing NG9-1-1 network capacity and PSAP services and support to first responders. These costs of receiving and delivering 911 calls and providing PSAP services and support include administrative services, operating equipment, technical

⁷⁴ See K. Lee, *supra* note 14 (recognizing that 911 calls could be generated by machines and sensors to send data and messages).

⁷⁵ See Gupta et al., *supra* note 29, at 9.

⁷⁶ Gupta et al., *supra* note 29, at 9.

⁷⁷ See NORTH CAROLINA 911 BOARD, NORTH CAROLINA ESINET CONCEPTUAL DESIGN DOCUMENT 7 (Mar. 7, 2016), <https://files.nc.gov/ncdit/NC%20NG911%20ESInet%20Conceptual%20Design%20FINAL.pdf> [hereinafter NC 911 Board] (recognizing the requirement of flexible and scalable bandwidth); *Emblaze Ltd. v. Apple, Inc.*, No. 5:11-CV-01079, 2014 WL 5079687, at *17 (N.D. Cal. Oct. 9, 2014) (defining bandwidth as “[t]he data transfer capacity, or speed of transmission, of a digital communications (sic) system as measured in bits per second (bps)”), *aff’d*, 639 F. App’x 639 (Fed. Cir. 2016).

2023]

HOLLOWAY

111

resources, and 911 telecommunicators and other staff.⁷⁸ State, county and municipal governments must provide funds and manage the operations and maintenance costs of NG9-1-1 networks and PSAP services and staff.⁷⁹ The Next Generation 9-1-1 Advancement Act⁸⁰ mandated a feasibility estimate of the costs of implementing NG9-1-1 services nationwide.⁸¹ This feasibility report was requested by Congress to provide an understanding of the complexity of NG9-1-1 implementation, the extent of NG9-1-1 implementation to date, and the steps necessary to achieve the desired end state of NG9-1-1 deployment.⁸² Congress knows the cost of implementing NG9-1-1 services and modernizing PSAP operations in response to personal, public safety and other technology development transmitting more than 911 voice calls.⁸³ Congress, however, has chosen not to use this report to enact federal communications legislation fully implementing NG9-1-1 services and modernizing PSAP operations.

A bill introduced in the United States House of Representatives gives insight into costs of implementing NG9-1-1 services and modernizing PSAPs operations. The Build Back Better Bill proposed a \$10-billion dollar appropriation to cover the costs of implementing NG9-1-1 services and modernizing PSAP operations.⁸⁴ The Bill included an NG9-1-1 grant program to provide funds to state and other government entities implementing, operating, maintaining and managing NG9-1-1 services and PSAP operations.⁸⁵ The Bill would have required the states and other governmental units to establish a sustainable funding mechanism⁸⁶ that provides “adequate revenues to cover ongoing expenses, including operations, maintenance, and

⁷⁸ See NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 24, at 2.

⁷⁹ See NG9-1-1 COST ESTIMATE REPORT, *supra* note 13, at 12; FEDERAL COMMUNICATIONS COMMISSION, WHITE PAPER: A NEXT GENERATION 911 COST STUDY: A BASIS FOR PUBLIC FUNDING ESSENTIAL TO BRINGING A NATIONWIDE NEXT GENERATION 911 NETWORK TO AMERICA’S COMMUNICATIONS USERS AND FIRST RESPONDERS 3 (Sept. 22, 2011), <https://www.fcc.gov/document/pshsb-next-generation-911-cost-study>.

The funding of Enhanced (E) 9-1-1 and NG9-1-1 has long been a major policy concern of state 911 boards and agencies promulgating regulations to manage state 9-1-1 systems and county and municipal PSAPs. See Elaine Seeman, et.al., *The First Step in Modernizing Our 911 Emergency Call Centers: Revising the State Enhanced (E) 911 Legislative Funding Scheme to Efficiently Distribute 911 Funds*, ILL. J. OF L. TECH. & POL’Y, 289, 303–306 (2012).

⁸⁰ Pub. L. No. 112-96, 126 Stat. 156, 237 (2012), Subtitle E, §§ 6501–6509 (2012).

⁸¹ See NG9-1-1 COST ESTIMATE REPORT, *supra* note 13, at 1-2.

⁸² Next Generation 9-1-1 Advancement Act of 2012, Pub. L. No. 112-96, 244, Subtitle E, § 6508(a).

⁸³ See NG9-1-1 COST ESTIMATE REPORT, *supra* note 13, at 12.

⁸⁴ H.R. 5376, 117th Cong., § 31101(a)(1).

⁸⁵ *Id.*

⁸⁶ *Id.* at § 31101(b)(1)(C).

upgrades.”⁸⁷ Until Congress enacts appropriate federal communications legislation, the states must continue to appropriate funds to implement and maintain NG9-1-1 services and modernize and manage PSAP operations.

3. Weighing Public Benefits and External Costs

Federal and state policymakers must weigh and balance employment, tax, and other economic development benefits against operational and maintenance costs imposed by these industries on the public management and maintenance of ESInets and PSAPs. The administrative, operational, and maintenance costs include uncompensated demands or external costs imposed by these industries on government-owned or privately managed NG9-1-1 networks and government-owned and managed PSAP operations.⁸⁸ Specifically, external costs are increases in operations and maintenance caused by substantial increases in access to and uses of NG9-1-1 network capacity and PSAP capabilities, telecommunicators time, and staff. These increases in access and use must be considered in the design and management of NG9-1-1 networks and PSAP operations. On enough network capacity and other capabilities, the North Carolina NG9-1-1 Conceptual Design states that “[t]he overall design must allow for the ability to scale with respect to bandwidth, adding new sites and interconnection with other ESInets. This includes the ability to double North Carolina NG9-1-1 Conceptual Design bandwidth”⁸⁹ In addition, this “design must accommodate this level of expansion without wholesale replacement of network components, forklift upgrades, or excessive non incremental costs.”⁹⁰ Thus, these industries and their sales and contracts may unintentionally or intentionally externalize costs to federal, state, county, and municipal governments by increasing access and use of NG9-1-1 networks and PSAP services and support.

These industries externalize or pass on costs to municipal, county, and state governments by using NG9-1-1 networks to transmit or deliver all types of 911 calls, data, and multimedia information. On the receiving end, PSAPs need NPSBN to deliver 911 calls, messages, data, and multimedia information and provide interpretive services and

⁸⁷ *Id.* at § 31104(13).

⁸⁸ See Lisa Grow Sun & Brigham Daniels, *Externality Entrepreneurism*, 50 U.C. DAVIS L. REV. 321, 327 (2016) (citing R.H. COASE, *THE FIRM, THE MARKET, AND THE LAW* 24 (1990)) (defining externality as “the effect of one person’s decision on someone who is not a party to that decision”).

⁸⁹ *Id.* at 30.

⁹⁰ NORTH CAROLINA 911 BOARD, *supra* note 78, at 31.

command support to first responders and agencies. This delivery by PSAPs will eventually require them to use the fee-based NPSBN⁹¹ to notify and support first responders and agencies managing emergencies, incidents, and accidents.⁹² FirstNet offers smartphone, data and broadband plans with different fee arrangements for usage of NPSBN.⁹³ PSAPs facing increases in usage may incur costs as part of end-to-end communications infrastructure delivering all types of 911 calls, data, and multimedia information to first responders and agencies.⁹⁴ Alarms, monitoring devices, and other products and services can increase access to or use of NG9-1-1 networks, PSAP services, and NPSBN. This increased access to PSAPs by the public and use of its services by first responders and agencies include the following: (1) sending emergency 911 information, videos and data,⁹⁵ (2) retrieving or managing supplemental data,⁹⁶ (3) requesting interpretive and other services,⁹⁷ (4) aiding first responders to respond more rapidly,⁹⁸ and (5) using NPSBN to give PSAP support and services to first responders and agencies.⁹⁹ The external costs are imposed on municipal, county, and state governments by these industries using business development and other strategies based on free access and use of public NG9-1-1 networks, PSAP services and NPSBN.

IV. INVESTMENTS IN POLICY AND STRATEGIES INCREASING USE OF 911 CALLS

These industries create business development and other strategies of economic development to make products and services, enabling persons and organizations to make and augment 911 calls, data, and multimedia information and allow first responders to request emergency medical and other emergency services. Technology drives both business strategies and communications policy that affects

⁹¹ See 47 U.S. Code § 1428(a)(1).

⁹² See NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

⁹³ See 47 U.S.C. § 1428(b)(1) (2023) (imposing limits on the fees that can be charged for usage of NPSBN); see also *Rate Plans*, FIRSTNET (last visited on July 18, 2023), <https://www.firstnet.com/plans.html> (listing the rate plans for usage of wireless and broadband services of the NPSBN by public safety services and their employees).

⁹⁴ See 47 U.S.C. § 615 Note (Findings and Purpose) (2020) ("Congress finds that (1) the establishment and maintenance of an end-to-end communications infrastructure . . . will reduce response times for the delivery of emergency care, assist in delivering appropriate care, and thereby prevent fatalities.").

⁹⁵ See NAT'L PUB. SAFETY TELECOM. COUNCIL, *supra* note 14, at 2 (finding that machines and sensors can make 911 calls and send data and messages).

⁹⁶ See NAT'L PUB. SAFETY TELECOM. COUNCIL, *supra* note 14, at 2.

⁹⁷ See NAT'L PUB. SAFETY TELECOM. COUNCIL, *supra* note 14, at 2.

⁹⁸ See NAT'L PUB. SAFETY TELECOM. COUNCIL, *supra* note 14, at 3.

⁹⁹ See NAT'L PUB. SAFETY TELECOM. COUNCIL, *supra* note 14, at 3.

augmenting and making, respectively, 911 calls using NG9-1-1 networks and PSAP services. State economic development policymakers can urge executives and managers to use either business growth, development, or entrepreneurial strategies to manufacture products and provide services relying on NG9-1-1 networks and PSAP services and support.

A. Technology in Noncommunications Industries

These industries can increase public demands on government-owned NG9-1-1 networks, PSAP services, and NPSBN by planning, implementing, and managing business strategies supporting state, county, and municipal economic development policy. These demands are caused by uses of health and home health monitoring, physical security, and risk management products and services, such as alarm systems, monitoring devices, and home security services. Thus, the public need for 911 calls and PSAP support and services justify giving tax incentives, industrial sites and other public benefits to urge the manufacture of products and performance of services by these industries.

1. Challenges of Relying on Public Communications Infrastructure

NG9-1-1 services and PSAP operations are public communications infrastructure that includes ESInets and PSAP services and support to receive and deliver 911 calls sent from or augmented by personal, 5G, AI, and IoT technologies.¹⁰⁰ All states have not completely implemented ESInets and modernize PSAPs.¹⁰¹ This incomplete implementation of ESInets does not allow NPSBN to converge at PSAPs in many counties and municipalities.¹⁰² This convergence allows PSAPs to receive voice and other 911 calls through NG9-1-1 services and deliver 911 calls that include voice, data, and multimedia information from personal technologies to first responders. One commentator noted that “the speed at which technology advances remains stunningly rapid, and the resulting effects on the public’s mobility and access to new communication devices and applications continue to challenge 911

¹⁰⁰ NAT’L 911 PROGRAM, *supra* note 30, at 2 (recognizing the challenges and barriers facing economic development dependent on NG9-1-1 networks and PSAP operations).

¹⁰¹ NATIONAL 9-1-1 OFFICE, 2019 NATIONAL 911 PROGRESS REPORT, 67–68 (2019), <https://www.911.gov/pdf/National-911-Program-Profile-Database-Progress-Report-2019.pdf> (finding NG9-1-1 Core Functions have been partially implemented by several states).

¹⁰² See Wilde, *supra* note 55 (explaining the benefits provided by NPSBN to PSAPs and first responders).

2023]

HOLLOWAY

115

services.”¹⁰³ This challenge justifies modernizing PSAPs and connecting them to NPSBN so that all 911 telecommunicators can deliver all types of 911 calls to first responders. NPSBN allows PSAP staff to retrieve data for and provide other services to first responders. Thus, 5G, AI and IoT would present a lesser challenge if Congress appropriates funds and makes regulatory guidance to implement NG9-1-1 services and modernize PSAP operations.

2. Personal Technologies Driving Public Safety Needs

The uses of personal technologies include requests for emergency medical, fire, and public safety services. These technologies justify the need to implement NG9-1-1 services and modernize PSAP operations and include smartphones, wearables, and other devices used by persons and organizations to make 911 calls. Remote monitoring devices can connect to health and home health monitoring systems that can provide messages, data, and multimedia information on personal health and medical conditions.¹⁰⁴ Personal technologies depend on NG9-1-1 networks, PSAPs, and NPSBN to deliver 911 calls, data, and multimedia information to first responders and agencies. Specifically, ESInets deliver 911 calls to PSAPs that require the delivery of PSAP services and support to first responders needing to assess and manage events, accidents, and incidents.¹⁰⁵ Thus, smartphones and other personal technologies make 911 calls that can include data and multimedia information from alarms and monitoring devices.

3. Aligning Technology with Public Interests

Technology imposes a challenge to 911 calls protecting public safety interests but creates manufacturing and other business opportunities directly supporting state economic development interests. The states and federal government share a common concern for their respective interests. This concern is furthering the public interests of protecting health, property and safety and advancing the public interests of creating jobs and raising tax revenue.¹⁰⁶ States advance state economic development policy by urging industries to use

¹⁰³ NAT’L 911 PROGRAM, *supra* note 30, at 2 (recognizing the challenges and barriers facing economic development dependent on NG9-1-1 networks and PSAP operations).

¹⁰⁴ *See* Cryts, *supra* note 15, at 17 (recognizing that home health monitoring devices can be connected to health care systems).

¹⁰⁵ *See* NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 3-4.

¹⁰⁶ *See* Communications Act, Pub. L. 73-416, Stat. 1064 (1934) (advancing communications interests); N.C. Gen. Stat. § 158-7.1 (2023) (furthering economic development interests).

technology in business growth,¹⁰⁷ development,¹⁰⁸ and entrepreneurship.¹⁰⁹ The federal government depends on IP-based communications and wireless technologies to enable personal and other technologies to make or augment 911 calls to PSAPs. Although these governments share a common concern, federal and state policymakers must ensure business growth and other strategies supporting economic development do not undermine federal communications policy furthering public safety interests. One must conclude that federal communications policy protecting life, health and safety takes priority over state economic development policy advancing state economic growth and purposely influencing business interests. However, Congress's refusal to appropriate funds and impose regulatory guidance to implement NG9-1-1 services and modernize PSAP operations irrationally closes off aligning public safety interests of federal communications policy with economic interests of state economic development policy.

B. Technologies Advancing Public and Private Interests

Technology can further both public and private interests when states and federal government recognize the need for federal policy to advance mutually beneficial interests. NG9-1-1 and its IP-based technology and NPSBN and its wireless technology are not alone in driving business strategies for the noncommunications industries. As previously stated above, other technologies include IoT, 5G, and AI that can affect the delivery of 911 calls, messages, data and multimedia information and can impact PSAP support and services to first responders and agencies. IoT, 5G, and AI technologies can support both economic development interests and public safety interests by protecting the health, safety and property of persons and organizations.

1. Internet of Things (IoT)

IoT can connect devices and products, such as monitors, to the internet enabling owners and risk managers to reduce risks and liabilities.¹¹⁰ "Internet of Things (IoT) describes a vast array of objects with sensing and actuating devices that collect, analyze[,] and share data across other objects, programs, and platforms. . . ."¹¹¹ IoT devices that

¹⁰⁷ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 4.

¹⁰⁸ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 50.

¹⁰⁹ INT'L. ECON. DEV. COUNCIL, *supra* note 9, at 19.

¹¹⁰ See Alex Koohang et al., *Internet of Things (IoT): From awareness to continued use*, INT'L J. INFO. MGMT. at 1 (2022); Dutton, *supra* note 26, at 2-3.

¹¹¹ Koohang, et al., *supra* note 110, at 1.

can connect household items and industrial devices are increasing rapidly.¹¹² Thus, IoT can affect access, use, and contents of 911 calls, messages, data, and multimedia information.

IoT technologies can support public safety, emergency medical, and other emergency services to advance public safety interests under federal communications policy. This support includes the use of IoT in health monitoring, physical security, and risk management products and services to make or augment 911 calls, multimedia information, and data.¹¹³ Moreover, “[f]rom 2012–2018, the use of IoT devices grew from 8.7 billion to 50.1 billion even though adoptions in homes and retail areas were still relatively sparse.”¹¹⁴ In addition, IoT can use sensors to provide information and allow devices to communicate with other devices to create new applications.¹¹⁵ In physical security systems, IoT can be used in protecting valuable personal property from theft by improving tracking and ring fencing.¹¹⁶ IoT also includes wearable devices that can be used in the workplace to allow employers to track employees and monitor their health, productivity, and performance.¹¹⁷ Thus, the expansive uses of IoT show the impact of technology development on public safety interests and economic development by designing and manufacturing devices to connect things.

IoT is most beneficial in advancing public safety and supporting economic development interests in using products and services to save lives, reduce injuries, and protect private property. The use of IoT to connect devices gathering, storing, sending, and sharing medical and personal data may raise public policy concerns and legal issues regarding personal privacy.¹¹⁸ Eventually, federal and state policymakers may need to review privacy concerns and issues of intrusive monitoring and data gathering devices. Thus, IoT can enable health monitoring, physical security, and risk management products and services to make greater uses on NG9-1-1 services, PSAP operations, and first responder services.

¹¹² See Koohang, et al., *supra* note 110; See Dutton, *supra* note 26, at 2.

¹¹³ See Dutton, *supra* note 26, at 3.

¹¹⁴ Koohang et al., *supra* note 110, at 1.

¹¹⁵ See Kanowitz, *supra* note 35.

¹¹⁶ See Dutton, *supra* note 26, at 3 (finding that [a]ctuators may affect persons other than their owners).

¹¹⁷ Koohang et al., *supra* note 110, at 1.

¹¹⁸ Koohang et al., *supra* note 110, at 2; Graham Johnson, Note, *Privacy and the Internet of Things: Why Changing Expectations Demand Heightened Standards*, 11 WASH. U. JURIS. REV. 345, 348–49 (2019) (citing Melissa W. Bailey, *Seduction by Technology: Why Consumers Opt Out of Privacy by Buying into the Internet of Things*, 94 TEX. L. REV. 1023 (2016)).

2. Fifth Generation Cellular Networks (5G)

As the communications industry replaces the fourth generation (4G) cellular networks, the fifth generation (5G) wireless cellular networks will create new benefits and advantages for consumers and clients as well as business opportunities. As technology surpasses what was once novel in the 4G network era, 5G networks will be expected to “provide mobile services that require high speed, rapid response, high reliability, and energy efficiency.”¹¹⁹ Unlike its 4G predecessor, 5G characteristics will include “instantaneous cloud services, tactile Internet, enhanced vehicle-to-everything (eV2X), Internet of things (IoT) and communication with drones and robots”¹²⁰ The high speed and other characteristics of 5G support technology development allowing the public to gain greater access to emergency services through 911 calls, data, and multimedia information.

The 5G networks will also allow new contents, service concepts and capabilities to support economic development policy and further public safety and communications interests. These contents and concepts include 360-degree videos and smart transportation.¹²¹ The 5G networks will allow the development of “unlimited data transmission, a massive number of active connections and new types of mobile devices, especially sensors, powered by sustainable energy sources.”¹²² The 5G networks include personal communications, such as “mobile phones, wearable devices, sensors, actuators, vehicles, [and] robots.”¹²³ The 5G cellular technology’s theoretical peak speed is twenty gigabits per second (Gbps), as compared to the one Gbps peak speed of 4G.¹²⁴ Thus, 5G wireless cellular networks offer greater protection to consumers and clients using NG9-1-1 networks, PSAP services and NPSBN and greater support of business growth and other strategies supporting state economic development policy.

3. Artificial Intelligence (AI)

AI must be considered and weighed in PSAP operations and NG9-1-1 services; AI can be used by these industries to manufacture monitoring devices and other products and perform physical security

¹¹⁹ Yu et al., *supra* note 24, at 1.

¹²⁰ Yu et al., *supra* note 24, at 1.

¹²¹ Yu et al., *supra* note 24, at 1.

¹²² Yu et al., *supra* note 24, at 1.

¹²³ Yu et al., *supra* note 24, at 1–2.

¹²⁴ Jack Vaughn, *5G in IoT Starts to Crystallize in Industrial IoT Market*, IOT WORLD TODAY (Feb. 19, 2020), <https://www.iotworldtoday.com/2020/02/19/5g-in-iot-starts-to-crystallize-industrial-iot-market/>.

and other services. Recent attention and public concern over AI have increased due to recent applications, such as “advancements in large data sets, increased computing power, improved machine learning algorithms, and open-source code libraries.”¹²⁵ AI can use *rule-based (RB) systems or machine learning (ML) systems*. AI includes “RB systems [that] learn through a process of reducing knowledge to if-then statements—known as a *rule set* or *rule sets*—whereby each rule obliges a specific output that is predetermined by the given input. One or more humans teach the machine or computer.”¹²⁶

Next, AI includes machine learning (ML) where the machines or computers “learn’ by interactions with a real environment, a simulated environment, and/or training data sets.”¹²⁷ “ML systems use a mathematical algorithm built with software code that gives varying values to data which is imputed into the system.”¹²⁸ Consequently, government and industry officials must consider and weigh the effects of AI on public policy where IoT devices and sensors are used to collect vast amounts of safety, health, personal, public safety, and other data.

PSAPs may need more staff and expertise in gathering, managing and processing messages, data and multimedia information to deliver interpretive and other services and provide command, control and other support of first responders and agencies. The need for PSAPs to analyze, retrieve, and support first responders and agencies may create a role for AI in NG9-1-1 services and conducting PSAP operations. This role involves delivery of 911 calls, data, and multimedia information and retrieval and review of personal records, medical information, and videos. The capabilities of AI can support managing and performing tasks that are needed by PSAPs to provide command support and interpretive services to first responders and agencies.¹²⁹ AI must be considered in performing analytical and other tasks in responding to 911 requests by first responders for routine and nonroutine PSAP support and services.¹³⁰ Thus, AI may be needed to aid in making timely responses to requests by first responders and agencies for PSAP services and support.

¹²⁵ Jacobs & Keefe, *supra* note 27, at 1.

¹²⁶ Jacobs & Keefe, *supra* note 27, at 1.

¹²⁷ Jacobs & Keefe, *supra* note 27, at 1.

¹²⁸ Jacobs & Keefe, *supra* note 27, at 1.

¹²⁹ See Donny Jackson, *2021 is when AI in public safety gets real*, AM. CITY & CNTY. (Dec. 11, 2020), <https://www.americancityandcounty.com/2020/12/09/2021-is-when-ai-in-public-safety-gets-real/> (pointing to uses of assistive AI in performing PSAP tasks).

¹³⁰ Jacobs & Keefe, *supra* note 27, at 2 (discussing the impact of AI on NG9-1-1 services and PSAP operations).

C. Investments in Communications Infrastructure and Economic Development

Home health monitoring, physical security, and risk management industries need the complete implementation of NG9-1-1 services, modernization of PSAP operations, and timely connection to NPSBN to plan, implement, and manage business growth and other strategies. These industries manufacture products and perform services to further private or business interests in delivering personal data and multimedia information to PSAPs. These products and services are created by business growth and other strategies to design, manufacture and market alarms, monitoring devices and other products that can be placed on vehicles and equipment.¹³¹ The private investments in products and services affect the contents and delivery of 911 calls to PSAPs that eventually need to subscribe to the fee based NPSBN and that must connect PSAPs to first responders and agencies.

1. Impetus for Investments in Making and Augmenting 911 Calls

Commercial products and services of these industries are widely marketed to governments, organizations, and persons for the purpose of making and augmenting 911 calls to save lives, reduce injuries, and protect properties. The impetus for these products and services are private investments in profitable business development, growth, and entrepreneurial strategies. The economic purposes of private investments can support the public purposes of NG9-1-1 networks and PSAP services that also save lives, reduce injuries, and protect properties. Furthermore, organizations and persons need these products and services, which include devices and home services, to request emergency medical, fire, and law and enforcement services.¹³² These products and services advance only private or business interests but still support public interests, such as public safety.¹³³ But private interests depend on the federal communications policy to implement NG9-1-1 services and modernize PSAP operations. Consequently, the federal government must enact federal communications legislation permitting persons to send and requiring PSAPs to receive all types of

¹³¹ See NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹³² See K. Lee, *supra* note 14 (recognizing that the 911 app delivers the call to an operator who calls the PSAP).

¹³³ See K. Lee, *supra* note 14.

911 calls,¹³⁴ and enabling PSAPs to retrieve data and information and provide services and support to first responders and agencies.¹³⁵

Business growth and other strategies are planning and management to enable these industries to make products and create services protecting lives, personal health, and private property. These business strategies are mutually supportive of the purposes of implementing NG9-1-1 services and modernizing PSAP operations to save lives, protect property, and reduce injuries. Both private interests and public interests justify public and private investments in business strategies and federal communications policy, respectively, protecting health, lives, and private property.

2. Public Investments in NG9-1-1 and PSAPs

Public investments in communications infrastructure can stimulate business growth or other strategies urged by state economic development policy to motivate and incentivize manufacturing and service organizations. Economic development can rely on federal and state public investments to justify business growth in health and home health monitoring and other industries.¹³⁶ Statistical findings show that “at the national economic level the existence of a feedback process in which telecommunications investment enhances economic activity and growth.”¹³⁷ These findings also show that “economic activity and growth stimulate demands for telecommunications infrastructure investment.”¹³⁸ Government investments in NG9-1-1 services and PSAP operations will remove much uncertainty and risk in designing and manufacturing alarms and monitoring devices and providing risk management products and consulting services as either business growth, development, or entrepreneurship, such as remote health monitoring.¹³⁹ On the federal level, the refusal by Congress to make a substantial federal investment in NG9-1-1 services, PSAP operations, and efficient first responder services limits state economic development policy urging these industries to manufacture products and offer

¹³⁴ See NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹³⁵ See NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹³⁶ See INT’L ECON. DEV. COUNCIL, *supra* note 9, at 3-4.

¹³⁷ Francis J. Cronin et al., *Telecommunications Infrastructure Investment and Economic Development*, 17 TELECOMM. POL’Y 415, 416 (1993) (citing F. Cronin, E. Parker, E. Collieran & M. Gold, *Telecommunications Infrastructure and Economic Growth: An Analysis of Causality*, 15 TELECOMMUNICATIONS POLICY, 529–535 (Dec. 1991)) (finding investments in telecommunications are made to improve economic growth) [[https://doi.org/10.1016/0308-5961\(91\)90007-X](https://doi.org/10.1016/0308-5961(91)90007-X)].

¹³⁸ *Id.*

¹³⁹ See generally Cryts, *supra* note 15, at 17.

services to make and augment 911 calls, data, and multimedia information.

3. Private Investments to Advance Business Interests

Business interests include starting new business organizations and expanding existing business operations. Designing, manufacturing, and marketing physical security, monitoring, and other products and performing home security, insurance, and other services further business interests in municipalities, counties, and states. In the telecommunications industry, “the national impact of economic development . . . extends to state, county, and municipal levels where telecommunications investment affects economic activity and . . . economic activity can affect telecommunications investment.”¹⁴⁰ Moreover, “the importance of the county-level findings . . . indicate[s] that even relatively small geographic areas can be affected by investment in telecommunications infrastructure.”¹⁴¹ Thus, business investments can potentially support both state economic development interests and federal communications interests.¹⁴²

Insurance, alarm, and other organizations need to make investments in manufacturing products and providing services to expand and grow their business in state, county, and municipal markets. These investments are needed to make products and services making and augmenting 911 calls to PSAPs and augmenting request for PSAP services and support to first responders and agencies aiding and assisting persons and organizations in emergencies, hazardous situations, and dangerous weather conditions. In the states, telecommunications (and perhaps health monitoring), home security services and other investments can affect municipal and county job creation and other economic activity to further economic development interests, such as making profits and revenues.¹⁴³ In these industries, private investments further business interests to expand or create markets and make revenues by manufacturing products and performing services, such as health care monitoring systems.¹⁴⁴

¹⁴⁰ Cronin, *et. al.*, *supra* note 137, at 426.

¹⁴¹ Cronin, *et. al.*, *supra* note 137, at 426.

¹⁴² Cronin, *et. al.*, *supra* note 137, at 416.

¹⁴³ Cronin, *et. al.*, *supra* note 137, at 426.

¹⁴⁴ See Cryts, *supra* note 15, at 17 (recognizing that home health and other monitoring devices can aid in improving the quality of life of clients and patients); *see also* BILL HOBGOOD & BECKY WARD, IJIS INSTITUTE, ASAP-TO-PSAP CASE STUDY ON STANDARDS AND OUTCOMES 3 (2017), https://ijis.org/wp-content/uploads/2022/01/IJIS_WP_ASAP2PSAP_FINAL_20171211.pdf (noting that the alarm monitoring industry created efficiency by automating alarm calls sent to PSAPs).

V. INDUSTRY PRODUCTS AND SERVICES RELYING ON NG9-1-1 AND PSAPs

Health and home health monitoring, physical security, and risk management industries design and manufacture products and provide services to aid in using NG9-1-1 networks to transmit 911 calls to PSAPs. Each industry consists of different products and services that protect the health, safety, and lives of persons in the workplace, home, and schools. These products and services can gather and deliver different data and multimedia information for transmission by NG9-1-1 networks to PSAPs and by first responders using the NPSBN to request PSAP services and support. Each industry can use technology development, such as AI, IoT, and 5G, in making products and services to deliver or aid in delivering all types of 911 calls. Finally, each industry may use the products and services of one or both other industries to accomplish its business goals and provide market benefits to save lives, reduce injuries and protect property.

A. Health and Home Health Monitoring Products and Services

The health and home health monitoring industries can impact state economic development policy based on their needs for and uses of health and home health monitoring products and services. NG9-1-1 services enable some products or private operators to make 911 calls, add more personal data, and request more PSAP services and support. Federal policymakers knowledgeable about NG9-1-1 services and PSAP operations must ascertain and weigh the impact of the health and home health monitoring industry on state economic development policy urging business growth and other strategies. In turn, state policymakers must require this industry to weigh any business growth, development and entrepreneurial strategies increasing use of NG9-1-1 network capacity and PSAP staff and services in collecting and interpreting data and multimedia information to protect lives, health, and property.

1. Design of Home Health Monitoring Products and Service

The health and home health monitoring industry uses monitoring products and services to gather and provide data and multimedia information to improve health care, minimize health risks, and monitor health and fitness.¹⁴⁵ The design of health and home health monitoring products and services should consider the need for and uses of NG9-1-1 services and PSAP operations. Such products and services must be

¹⁴⁵ Anastasios Fanariotis et al., *An Embedded Framework Enabling Access of Elderly and Disabled Persons to IP-Based Emergency Communications*, 68 *MICROPROCESSORS AND MICROSYSTEMS* 74 (2019) [<https://doi.org/10.1016/j.micpro.2019.05.006>].

capable of contacting either private emergency call centers or PSAPs, thereby providing customers greater access to emergency, emergency medical, and public safety services. Remote health and home health monitoring and other devices and technologies provide valuable health care services to their patients.¹⁴⁶ In addition, “[m]ultiple companies are developing products to allow in-home patient monitoring through wearable monitoring systems, or patient self-performance of certain vital sign measurements.”¹⁴⁷ The design of health and home health monitoring devices and creation of services are sources of data, videos, and photographs useful to 911 telecommunicators and first responders in responding to emergencies and incidents.

Private researchers are studying technologies to enable first responders to provide more effective and timely responses to health care and medical care emergencies to save lives and reduce injuries.¹⁴⁸ The industries and researchers also find that “emergency services are evolving with the development of connected transport systems.”¹⁴⁹ In the future, connected vehicles can provide rich information that can be used by artificial intelligence to evaluate the accidents and to give suggestions on how to react. . . .¹⁵⁰ Health and home health monitoring products and services can effectively allow persons to know more about their health away from home and remain safe at home.¹⁵¹ These data and multimedia information collected by home health and health monitoring devices can be sent through NG9-1-1 networks to 911 telecommunicators at PSAPs.

2. Impact of Technology on Industry

The health and home health monitoring industry can impact state economic development policy based on the industry’s need for and uses of NG9-1-1 network capacity and PSAP operational capabilities. This industry includes uses of personal emergency response systems (PERS) and monitoring products to enable consumers and clients to make and augment emergency calls to privately-owned emergency

¹⁴⁶ See Cryts, *supra* note 15, at 17–18.

¹⁴⁷ Cryts, *supra* note 15, at 17–18; Lei Chen & Cristofer Englund, *Every Second Counts: Integrating Edge Computing and Service Oriented Architecture for Automatic Emergency Management*, J. ADVANCED TRANSP. (Feb. 5, 2018), at 1, 3 (finding the need for “an automated collaboration framework for emergency management that coordinates all stakeholders within the emergency response system . . .”).

¹⁴⁸ Chen & Englund, *supra* note 148, at 2.

¹⁴⁹ Chen & Englund, *supra* note 148, at 3.

¹⁵⁰ Chen & Englund, *supra* note 148, at 3.

¹⁵¹ See Cryts, *supra* note 15, at 17–18; NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

communications centers.¹⁵² For example, home health monitors equipped with sensors can automatically make 911 calls if an emergency arises in the home, retail business, or workplace.¹⁵³ Moreover, health, home health, and medical alert devices can be equipped with Geographical Information System (GIS) to aid 911 telecommunicators and private operators in determining the location of persons.¹⁵⁴ The monitoring products or devices may include automatic or operator assisted 911 calls to contact PSAPs through NG9-1-1 networks to request emergency medical and public safety services.¹⁵⁵ This industry supports economic development and public safety by manufacturing products and performing services, such as private operators, to protect lives, health and property.

Technology development of IoT, 5G, and AI greatly expands the capabilities of health and home health monitoring industry to pursue economic development strategies. These technologies can be used to allow individuals to take part in monitoring their health and its needs.¹⁵⁶ Individuals can record health information and monitor their fitness using fitness tracking devices.¹⁵⁷ Technology development will allow the health and home health monitoring industry to continue to pursue business development and other strategies by designing, manufacturing, and using new products and creating and performing new services.

3. Industry Demands on PSAPs

Health and home health monitoring products and services give doctors, nurses and individuals and their families more medical and personal details on their personal health and fitness and medical conditions.¹⁵⁸ These products and services use sensors and computer

¹⁵² See, Randi Stokke, *The Personal Emergency Response System as a Technology Innovation in Primary Health Care Services: An Integrative Review*, 18 J. MED. INTERNET RES. at 1, 2 (2016) (identifying three generations of personal emergency response devices and alarms to assist and aid elderly, disabled and other persons) [<https://doi.org/10.2196/jmir.5727>].

¹⁵³ See MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

¹⁵⁴ See RIC SKINNER, GISP, GIS IN HOSPITAL AND HEALTHCARE EMERGENCY MANAGEMENT, 225 (2010), <https://ebookcentral.proquest.com/lib/eastcarolina/detail.action?docID=566101> [<https://doi.org/10.1201/9781439821312>].

¹⁵⁵ See Cryts, *supra* note 15, at 17; Anastasios Fanariotis et al., *supra* note 145, at 74 (noting personal devices that are used by persons with disabilities needing to call 911 centers).

¹⁵⁶ See Cryts, *supra* note 15, at 18-19.

¹⁵⁷ See *id.* at 18-19; Fanariotis et al., *supra* note 146, at 74.

¹⁵⁸ See Cryts, *supra* note 15, at 17; Fanariotis et al., *supra* note 145, at 74 (stating that wearable devices give persons with impairments access to PSAPs).

software to measure vital signs and monitor health and medical conditions of persons.¹⁵⁹ For example, “[t]he team sits at workstations monitoring patients who are located in their homes, and connects with patients if any of their numbers deviate significantly from their baseline biometric data.”¹⁶⁰ With the use of monitoring devices in medical emergencies, 911 calls can now include personal and health data and videos and other multimedia information in requesting emergency medical services.¹⁶¹ These data and information are also helpful to first responders in aiding stroke and other victims to survive medical emergencies and may also avoid emergencies by responding to early warning signs indicated by changes in vital signs.¹⁶² Thus, whether from business growth or another strategy, the health and home health industry can use the capabilities of NG9-1-1 services and PSAP operations in designing, marketing, and manufacturing health and home health monitoring devices and services in support of state economic development policy.

B. Physical Security Products and Services

Business or economic development strategies, such as business growth, are created by the physical security industry to expand uses of devices, products, and services augmenting or making 911 calls, data, and multimedia information. These strategies depend on these products and devices to connect to NG9-1-1 networks and PSAP services and private operators to deliver more data and multimedia information for use by first responders. State policymakers who are knowledgeable about NG9-1-1 services and PSAP operations must urge the physical security industry to consider its impact on state economic development policy. State economic development policymakers must ask this industry to weigh any business growth, development and entrepreneurial strategies dependent on the expanding the uses of NG9-

¹⁵⁹ See Cryts, *supra* note 15, at 17–18.

¹⁶⁰ See Cryts, *supra* note 15, at 17.

¹⁶¹ See also Vikram Chandrasekaran et al., *Socio-Technical Aspects of Remote Media Control for a NG9-1-1 System*, 62 MULTIMEDIA TOOLS & APPLICATIONS 733, 734 (2013) (explaining the IP based communication system used to support and provide NG9-1-1 services) [<https://doi.org/10.1007/s11042-011-0875-1>].

¹⁶² See Marlis Gonzalez-Fernandez, *Editorial: Why Not Call 911?*, 41 STROKE 1318 (2010) (explaining the importance of treatment and time in treating stroke victims) [<https://www.ahajournals.org/doi/10.1161/STROKEAHA.110.585117>]; Chris Fussman et al., *Lack of Association Between Stroke Symptom Knowledge and Intent to Call 911*, 41 STROKE 1501, 1506 (2010) (noting that persons need to make an emergency call for warning symptoms of a stroke) [<https://doi.org/10.1161/STROKEAHA.110.578195>].

2023]

HOLLOWAY

127

1-1 networks and PSAP services in protecting property, reducing injuries and saving lives.

1. Design of Physical Security Products and Services

The physical security industry consists of products and services that need NG9-1-1 networks, PSAP services and support, and NPSBN service to protect private property, save lives, and reduce personal injuries of its clients and customers.¹⁶³ These products and services protect persons, homes, workplaces, and business organizations by using “voice, text, or video and related data[] and . . . nonhuman-initiated automatic event alerts, such as alarms, telematics, or sensor data, which may also include real-time voice, text, or video communications.”¹⁶⁴ Physical security devices and services depends on NG9-1-1 networks to deliver 911 calls, messages, data, and multimedia information to PSAPs. Thereafter, PSAPs deliver these calls, data, messages, and information through NPSBN to first responders and agencies responding to and managing emergencies, accidents, and incidents.¹⁶⁵

2. Impact of Technology on Industry

Physical security products and services using cameras, videos, and other monitoring devices allow first responders to make an earlier assessment and engage in earlier management before arrival at physical security incidents, such as bank robberies and home intrusions.¹⁶⁶ Access to real-time video streams from bank and municipal surveillance systems allows a faster assessment and earlier management of incidents and accidents, such as robberies and fires.¹⁶⁷ Moreover, the manufacture of alarm systems and other physical security devices can be a business growth strategy as urged by state policymakers to support state economic development policy. Business strategy may include the design and manufacture of physical security products and performance of home security and other services depending on NG9-1-1 networks and PSAP services to deliver 911.

Technology development can affect personnel, expertise and skills needed in PSAPs receiving and then delivering 911 calls to and responding to requests for services and support by first responders. PSAPs and their telecommunicators will need skills and equipment to

¹⁶³ HOBGOOD & WARD, *supra* note 144, at 3.

¹⁶⁴ MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

¹⁶⁵ MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

¹⁶⁶ MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

¹⁶⁷ MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

handle and deliver data and multimedia information automatically sent by alarm systems and other devices.¹⁶⁸ In addition, PSAPs will need staff and equipment to aid in retrieving supplemental data and supporting command and tactical operations of first responders.¹⁶⁹ For instance, in a bank robbery or similar incident, “[t]he alarm . . . prompts the PSAP to leverage the geofencing capability and social media to push out alerts to citizens advising them to stay out of the area until further notice.”¹⁷⁰ Thus, technology will require PSAPs and their staff and equipment to deliver 911 calls and provide technical services and tactical support to first responders and agencies responding to automated alarms and private operators sending more workplace and home security data and information.

3. Industry Demands on PSAPs

The industry demands imposed on NG9-1-1 networks and PSAP services are related to uses of alarm systems and other devices and services relying on 911 calls, messages, data, and multimedia information. Personal and public data, photographs, and videos that are received by 911 telecommunicators may need to be analyzed before being sent to first responders.¹⁷¹ PSAPs may need to process 911 calls, data and multimedia information that “may be reviewed/edited/repackaged . . . before being transmitted to first responders . . .”¹⁷² The processing of multimedia information by PSAPs may include “identify[ing] the single best picture of the incident (from all that are received) and only transmit[ing] that image to the first responder.”¹⁷³ Physical security products and services are made more capable by using AI, IoT, and 5G to add sensors and near real-time video to make or supplement 911 calls. These sensors, videos, and other data and information can inform first responders of the dangers they face in responding to accidents, medical emergencies, and incidents.¹⁷⁴ In imposing demands on PSAPs, the industry may increase the public costs of NG9-1-1 network bandwidth and PSAP staff, equipment, services, and

¹⁶⁸ MISSION CRITICAL PARTNERS, *supra* note 56, at 1; NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 1.

¹⁶⁹ MISSION CRITICAL PARTNERS, *supra* note 56, at 1; NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 1.

¹⁷⁰ MISSION CRITICAL PARTNERS, *supra* note 56, at 1.

¹⁷¹ NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹⁷² NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹⁷³ NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹⁷⁴ *See* MISSION CRITICAL PARTNERS, *supra* note 56, at 1 (noting the use of alarm systems); *see also* NAT’L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 1 (noting multimedia information and data on incidents and accidents).

support in delivering all types of 911 calls. These demands also include the use by PSAPs of the fee-based NPSBN to deliver these calls, provide technical services, and give command support to first responders and agencies. Thus, the physical security industry may impose significant technical, financial and labor demands on maintaining and operating NG9-1-1 networks and PSAP services to notify, serve and support first responders and agencies.

C. Risk Management Products and Services

NG9-1-1 services and PSAP operations may allow the risk management industry to create business growth and other strategies in making products, creating services, and making agreements to mitigate risks of accidents, incidents and events leading to injuries to persons, damages to property, and losses of lives. NG9-1-1 services deliver all types of 911 calls to PSAPs that, in turn, deliver these calls and provide services and support to first responders to mitigate the risks of losses and injuries in accidents, incidents and events. The risk management industry must weigh business growth, development and entrepreneurial strategies increasing access to and use of NG9-1-1 networks and PSAP services in reducing risk and addressing uncertainty in business operations and personal lives.

1. Design of Risk Management Products and Services

The risk management industry includes insurance contracts and other products and services requiring clients and customers to use practices to minimize personal injuries, reduce property damage, and avoid personal liabilities.¹⁷⁵ Business growth and other strategies could include new terms and conditions to insurance contracts and consulting services requiring clients to mitigate risk and liability in vehicle operations, traffic management, personal health, and other activities.¹⁷⁶ “Risk management is a process of identifying, measuring risk, and forming strategies to manage it through available resources. . . .”¹⁷⁷ In

¹⁷⁵ Shashi Kant Dahuja, *Telematics: The Future of Vehicle Insurance in India*, J. OF INS. INST. OF INDIA, at 18–19 (2019).

¹⁷⁶ See generally *id.* (recognizing that telematics can help in investigating claims and collecting that data can be used in setting prices and understanding risk); Eling Martin & Kraft Mirko, *The Impact of Telematics on the Insurability of Risks*, J. OF RISK FINANCE, at 77, 79 (2020) (finding that telematics can affect vehicle and other types of insurance).

¹⁷⁷ See Azhar Susanto Meiryani, *The Importance Of Risk Management In An Organizations*, 7 INT’L J. OF SCI. & TECHN. RSCH. 103, 106 (2018), <http://www.ijstr.org/final-print/nov2018/The-Importance-Of-Risk-Management-In-An-Organizations.pdf> (recognizing processes of managing risk in a business organization).

addition, “the focus of good risk management is the identification and way of dealing with risk.”¹⁷⁸ The mitigation of risk and liability requires persons, organizations, and institutions to consider uses of AI, IoT and 5G and other technologies to warn of hazards and dangers and use of NPSBN to notify PSAPs of accidents and incidents.¹⁷⁹ The exposure to risk and liability may require contractual obligations and business processes¹⁸⁰ using a specific type of 911 call, messages, data, or multimedia information or combinations thereof.¹⁸¹

2. Impact of Technology on Industry

The risk management industry will be affected by communications and other technologies in reducing the exposure to risk of organizations and persons wanting or needing to minimize harm and injury. Foremost, business organizations may need to monitor and limit exposure to probable occurrences of unlawful entries, fires, and negligent acts causing harm to employees, persons, or property. This exposure may cause the need to consider the broader role of 911 calls, messages, data, and multimedia information in avoiding or minimizing risks of injury to persons, loss of lives, and damages to property.¹⁸² In protecting persons and property, state economic development policymakers must urge the risk management industry to consider business strategies using IoT, AI, and 5G technologies and use of NPSBN services in using PSAPs and NG9-1-1 services to reduce risk through making or augmenting 911 calls with appropriate data and information. These technologies can greatly increase access to and use of 911 calls, data and multimedia information delivered to PSAPs and used by PSAPs to provide services and support to first responders.¹⁸³ These calls, data and information allow PSAPs to timely notify and effectively serve and support first responders in mitigating risks by more proficiently and timely responses to fires, robberies, active shooters and other incidents.

¹⁷⁸ See *id.*, at 106.

¹⁷⁹ Chen & Englund, *supra* note 147, at 3 (“[C]onnected vehicles are able to provide rich information that can be used by artificial intelligence to evaluate the accidents and to give suggestions on how to react.”).

¹⁸⁰ See Meiryani, *supra* note 177, at 106 (recognizing processes of managing risk in a business organization).

¹⁸¹ See Meiryani, *supra* note 177, at 106 (recognizing risk reduction in activities of business organizations).

¹⁸² See Meiryani, *supra* note 177, at 106 (using risk reduction as an activity to avoid or mitigate types of risks).

¹⁸³ See MISSION CRITICAL PARTNERS, *supra* note 56, at 2–3 (recognizing that some data may need to be analyzed by PSAPs).

Risk managers should require the use of NG9-1-1 services and PSAP operations to share with 911 telecommunicators and first responders all real-time data and multimedia information on active incidents and accidents. These requirements include the use of PSAP staff to provide interpretive services and command support to first responders at the scene of accidents, fires, and other emergencies.¹⁸⁴ For example, risk managers can reduce the harm and liability of their organizations and clients by using automated 911 calls to notify PSAPs and reduce the response time of law enforcement responding to and giving emergency assistance in burglaries and other unlawful entries.¹⁸⁵ These managers can use technologies to design 911 call packages for specific incidents, such as active shooters or tornados, to reduce risks and liabilities.¹⁸⁶ These packages may require specific data and multimedia information, such as building plans, to support specific public safety and agency responses needing to formulate better operational and tactical responses to minimize risks and liabilities.¹⁸⁷ On supporting state economic development policy, the risk management industry should add to insurance contracts and service agreements terms and conditions requiring consideration and use of NG9-1-1 networks, PSAP services and NPSBN to reducing risks and liabilities.

3. Industry Demands on PSAPs

The risk management industry will need to place demands on the use of NG9-1-1 services and PSAP operations by requiring 911 telecommunicators or another trained PSAP staff members to perform risk reduction tasks. The risk management industry must require organizations and persons to consider all types of 911 calls in notifying first responders to request emergency assistance by using automated or operator-assisted physical security alarms and health and home health monitoring products and services. The owners of real property and valuable personal property could be required to install more monitoring and security devices that include cameras, sensors, and actuators to deliver more data and information to 911 telecommunicators at PSAPs. These devices collect and send data, videos, and photographs to PSAPs and support law enforcement, fire departments, public safety and other emergency services in managing active incidents within and without

¹⁸⁴ NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

¹⁸⁵ NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 1.

¹⁸⁶ *See* Maier, *supra* note 16 (finding the need to deliver data in 911 voice calls).

¹⁸⁷ *See* Maier, *supra* note 16 (finding that risk management is implicated in managing safety); *See* Meiryani, *supra* note 177, at 106 (recognizing processes of measuring risk).

buildings.¹⁸⁸ The 911 calls, messages, data, and multimedia information can inform 911 telecommunicator or another PSAP staff member of structural, hazardous, and other conditions of buildings, such as special architectural features, to pass on to or inform first responders.¹⁸⁹ The risk management industry may eventually impose financial, technical and labor demands as it requires clients to fully use NG9-1-1 services and PSAPs. These demands include using PSAPs and their 911 telecommunicators, staff and equipment and directly asking PSAPs to fully engage NPSBN to give more services and support to first responders agencies reducing harm to persons and organizations, damages to real property, and losses of personal property.

VI. CONCLUSION

Federal communications policy conflicts with state economic development policy by not appropriating funds and providing regulatory guidance to implement NG9-1-1 services and modernize PSAP operations. This conflict is the denial of support to manufacture products and perform services by business organizations in health and home health monitoring, physical security, and risk management industries. This policy conflict limits state economic development policy by recognizing risk and uncertainty of planning and management of business development, growth and entrepreneurial strategies in these industries. Business planning and management of these strategies need the full implementation of NG9-1-1 services and complete modernization of PSAP operations to support state economic development policy urging the manufacture of products and performance of services of these industries.

Technology development leads state economic development policymakers to urge business growth and other strategies to increase jobs, tax revenues, and community growth. In these industries, these strategies are driven by IP-based NG9-1-1 networks delivering to PSAPs 911 calls, messages, data, and multimedia information. In addition, PSAPs provide services and support to requests made by first responders and agencies managing emergencies, incidents and accidents. Technology development includes uses of IoT, 5G, and AI in designing products and creating services to make and augment 911 calls, data, and multimedia information and provide PSAP services and support to first responders and agencies. Moreover, this development includes PSAPs using NPSBN to deliver these calls, data, and information

¹⁸⁸ See Martin & Mirko, *supra* note 182, at 79 (using telematics to collect data under terms of insurance contracts) [<https://doi.org/10.1108/JRF-07-2019-0129>].

¹⁸⁹ See NAT'L PUB. SAFETY TELECOMM. COUNCIL, *supra* note 14, at 2.

2023]

HOLLOWAY

133

and provide PSAP services and support to first responders and agencies. Until Congress resolves the federal-state policy conflict, these industries cannot fully plan and manage business growth and other strategies to fully design, make, and market monitoring, insurance, home security, personal safety, apps, and other products and services.

State economic development policy cannot urge business growth and other strategies under business uncertainty and risk created by Congress's long-standing refusal to enact federal communications legislation fully implementing NG9-1-1 services and completing modernizing PSAP operations. The conflict is not resolved until Congress appropriates enough funds to fully implement NG9-1-1 services and completely modernize PSAP operations. In starting this resolution, Congress must rethink its refusal to fully implement NG9-1-1 services and completely modernize PSAP operations and consider its unintended impact on these industries and state economic development policy. In the meantime, Congress must ascertain whether its refusal to implement NG9-1-1 services and modernize PSAPs causes a substantial policy conflict between federal communications policy and state economic development policy creating risk and uncertainty in planning for and management of business growth and other strategies of these industries.

If Congress is causing a federal-state policy conflict, it must ascertain whether the impact of this federal-state policy conflict substantially harms federal communications interests protecting public safety and substantially undermines state economic development policy urging business growth and other strategies of health and home health, physical security and risk management industries. Moreover, Congress must ascertain whether its appropriation of funds and making of regulatory guidance to implement NG9-1-1 services and modernize PSAP operations can support state economic development policy urging business growth and other strategies to improve manufacturing and services by these industries. Lastly, Congress must ascertain whether its refusal to enact federal communications legislation is presently denying these industries full participation in federal communications policymaking for NG9-1-1 services and preventing these industries from fully developing product and service markets supporting public safety, emergency medical and emergency services. Thus, Congress must recognize state economic development policy and federal communications policy can be mutually beneficial in advancing economic development interests and communications interests by protecting the lives, health, safety and property of persons, organizations and institutions.