

# Challenges and Opportunities in Advancing Equity in Georgia Manufacturing

Report of the Fall 2023 Georgia AIM All Consortium Equity Workshop

October 2024

John P. Nelson<sup>1</sup>  
Olajide Olugbade<sup>1</sup>  
Justin Biddle<sup>1</sup>  
Philip Shapira<sup>1,2</sup>

Correspondence: [justin.biddle@pubpolicy.gatech.edu](mailto:justin.biddle@pubpolicy.gatech.edu)

<sup>1</sup>School of Public Policy and Ethics, Technology, and Human Interaction Center (ETHIC<sup>x</sup>),  
Georgia Institute of Technology

<sup>2</sup>Manchester Institute of Innovation Research, Alliance Manchester Business School,  
University of Manchester



## Contents

EXECUTIVE SUMMARY & OPTIONS FOR ACTION	1
BACKGROUND	3
METHODS	3
RESULTS	4
<i>Session 1: Defining participation in Georgia's manufacturing economy</i>	4
<i>Session 2: Defining equity in Georgia's manufacturing economy</i>	7
<i>Session 3: Potential failure modes for Georgia AIM's equity goals</i>	12
<i>Session 4: Opportunities to improve Georgia AIM's equity outcomes</i>	19
<i>Session 5: Defining and assessing Georgia AIM's equity outcomes</i>	23
DISCUSSION: FOUR TENSIONS IN ECONOMIC DEVELOPMENT	26
ACKNOWLEDGEMENTS	28
APPENDIX: GEORGIA AIM PROJECT COMPONENTS	29

## **Abstract**

Recent economic development policy in the United States has, in a break from previous decades, identified equity as an explicit goal. However, little is known about what novel challenges and opportunities face economic development programs and practitioners in attempting to advance equity. This paper reports results from a workshop engaging 48 managers and staff working on components of the Georgia Artificial Intelligence Manufacturing Project (Georgia AIM), a \$65 million equity-focused regional economic development project funded by the U.S. Economic Development Administration and the Georgia state government. Participants discussed their understandings of economic participation and equity, potential obstacles and opportunities in achieving equity, and approaches to assessing equity outcomes. Results reveal diversity in understandings of equity in the manufacturing economy. Participants agree that widespread participation in manufacturing work partly constitutes manufacturing equity, but they exhibit more divergence about social, psychological, or environmental aspects of participation and equity. Meanwhile, participants identified a wide variety of both internal and external factors which will affect whether Georgia AIM achieves its equity goals. This report illustrates several tensions which equity-focused economic development projects will have to face—between promoting all or only some sorts of manufacturing jobs; between promoting benefits from manufacturing and reducing harms from manufacturing; and between achieving and assessing impact. Participants’ grounded perspectives on negotiating these tensions can provide guidance for future economic development projects.

## Executive summary

This report presents results from the Georgia AIM fall 2023 equity workshop, held in Atlanta in October 2023. Georgia AIM is a U.S. Department of Commerce-funded economic development project intended to equitably build out advanced manufacturing technology, workforce, and business in the U.S. State of Georgia. At the workshop, leadership and operations personnel from all 17 Georgia AIM subprojects discussed Georgia AIM’s goals and operations relative to equity. Attendees were prompted to discuss the following five topics: (1) defining participation in the manufacturing economy; (2) defining equity in manufacturing; (3) potential risks of failure in Georgia AIM’s equity goals; (4) opportunities to improve Georgia AIM’s operations relative to equity, and (5) assessing Georgia AIM’s equity outcomes.

In the discussion on defining participation in the manufacturing economy, attendees agreed that participation centers around a core conceptualization of operating and working in manufacturing firms, to which other concepts of participation (e.g., education, using manufactured goods) contribute. Some attendees also advanced a definition of participation as positive contribution to Georgia communities. Attendees agreed that increasing equity in manufacturing includes increasing equity in access to resources and opportunities necessary to participate in manufacturing; and increasing fairness in distribution of costs and benefits of manufacturing. Finally, some attendees suggested that equity requires equitable distribution of autonomy and decision-making power.

In a red-teaming exercise to identify risks, attendees articulated a variety of potential “operations failures” whereby Georgia AIM could fail to deliver intended programming. They also discussed a smaller set of potential “adverse outcomes failures” whereby Georgia AIM’s intended programming could result in equity harms, e.g., contributing to the elimination of jobs, livelihoods, or ways of life; manipulating or coercing persons into manufacturing; or benefiting firms at the expense of Georgia communities. Attendees also discussed many opportunities through which Georgia AIM could improve its equity outcomes. These included expanding coordination across the Georgia AIM project; aligning programming with local needs, capabilities, and opportunities; tailoring outreach, messaging, and programming to diverse target audiences; and pursuing the sustainability of operations after the end of the initial grant period.

Attendees called for evaluation of both regional and individual project outcomes, and both economic and broader community impacts, through both “hard” measures of outcomes and direct feedback from project stakeholders. Attendees suggested both quantitative and qualitative methods for evaluation as well as evaluation practices such as inter-state comparison and external contracting. Finally, attendees observed a variety of ethical, epistemic, and resource constraints under which evaluation must operate, including the costs of evaluation, the tendency of evaluation to influence the evaluated activities, and privacy-related data limitations.

The authors have synthesized attendees’ comments into a set of options for action. We derived these actions in two ways. First, we included actions for which attendees directly called. Second, we noted points of disagreement among attendees and included actions for addressing such inconsistencies. The derived “Action Options” reflect the perspectives of Georgia AIM leaders as expressed at the equity workshop. Potential actions will need to be further specified to the circumstances and resources of each Georgia AIM project.

## **Action Options raised by the Georgia AIM fall 2023 equity workshop**

**Action Option 1:** Clarify scope of Georgia AIM goals across subprojects (Sessions 1, 2, & 3). Attendees disagreed or were unsure about answers to the following questions:

- Should Georgia AIM shape the manufacturing activity and jobs it creates to promote societal benefits from manufacturing and mitigate societal harms (Session 1)?
- Should Georgia AIM promote manufacturing participation by disadvantaged groups not specified in the initial grant (Session 2)?
- Should Georgia AIM prioritize promoting growth in manufacturing, or promoting growth in community and individual autonomy to decide whether and how to engage with manufacturing (Sessions 2 & 3)?

**Action Option 2:** Assess and mitigate potential adverse impacts of Georgia AIM activities (Session 3). Attendees identified potentially adverse impacts including the following:

- Elimination of accessible jobs
- Elimination of some livelihoods or ways of life
- Contribution to market and societal dominance of large firms

**Action Option 3:** Facilitate intra-project communication and cooperation (Session 4). Attendee priorities included the following:

- Regular meetings and channels of communication across Georgia AIM projects
- Replication and scaling of successful Georgia AIM activities
- A platform to share event schedules across Georgia AIM projects
- Collection and sharing of Georgia AIM success stories

**Action Option 4:** Assess, and, if necessary, improve alignment of Georgia AIM activities with diverse community and firm needs and opportunities (Session 4). Attendee priorities included the following:

- Assess whether existing Georgia AIM programming is accessible and useful to all target populations and regions
- Work in participatory fashion with communities and firms to align programming with local needs, capabilities, and opportunities
- Tailor Georgia AIM outreach and communications, in representatives, platforms, and engagement modes, to diverse target audiences throughout Georgia

**Action Option 5:** Develop and disseminate a central plan for assessment of Georgia AIM outcomes (Session 5). Attendee priorities included the following:

- Develop a top-level account of equity success integrating workshop insights, and defining assessment metrics on the state, regional, and project levels over relevant time periods
- Integrate detailed, qualitative investigation of project outcomes with quantitative assessment plans
- Identify and mitigate dangers of evaluation, e.g., excessive cost, distortion of project activities, and privacy violations.

## **Background**

The Georgia Artificial Intelligence Manufacturing Project (Georgia AIM) is a multilateral initiative across universities, nonprofits, and regional governments in the U.S. state of Georgia, intended to equitably develop and deploy advanced manufacturing technologies (with an emphasis on artificial intelligence) and workforce in Georgia. As part of this larger goal, many components of Georgia AIM seek to equitably increase participation in Georgia's manufacturing economy. Georgia AIM is funded by a four-year grant from the U.S. Department of Commerce Economic Development Administration (EDA). Georgia AIM's grant proposal heavily emphasizes advancing equity in the Georgia manufacturing economy through targeted programming and support for groups traditionally underrepresented in the Georgia manufacturing economy, including women, Black Americans, veterans, and disabled persons; and through spreading benefits of manufacturing to rural and economically depressed regions of Georgia.

Georgia AIM consists of a diverse set of public and nonprofit projects conducted by a range of organizations that span technology development, technology extension and consultation, workforce development, and economic development planning (Appendix 1). Organizational diversity and distribution are strengths, as they permit Georgia AIM to concurrently work through multiple channels to advance equity and manufacturing across Georgia's geographic and economic landscape. However, diversity and distribution also introduce challenges of coordination, goal-setting, assessment, and communication across the project, including for the advancement of Georgia AIM's equity goals.

At the request of Georgia AIM leadership, the authors of this report—who are funded under Georgia AIM Projects 1 and 8 to investigate ethics and societal implications of artificial intelligence in manufacturing—were asked by Georgia AIM management to facilitate a workshop on the conceptualization, operationalization, and assessment of equity advancement across the Georgia AIM project. This workshop was intended to provide practical insights that would assist Georgia AIM leadership in designing Georgia AIM activities to advance equity in Georgia's manufacturing economy; to identify and avoid pitfalls and harms by which Georgia AIM might fail to do so; and to assess Georgia AIM's equity outcomes to permit reporting and, if necessary, adjustment of project activities. This report documents the varied discussions which occurred at the workshop and distills options for action identified by attendees.

## **Methods**

The Georgia AIM equity workshop was allocated two hours within Georgia AIM's October 17, 2023, All-Coalition meeting. Discussion questions were defined through consultation between the authors and Georgia AIM project leadership, with the goal that the workshop would produce information relevant and useful to Georgia AIM. Forty-eight persons attended and participated in the workshop, including the leadership of projects covering advanced manufacturing technology development, advanced manufacturing and cybersecurity technology extension, STEM workforce development, and regional economic development planning across Georgia. Leadership and personnel for all 17 Georgia AIM subprojects

(Appendix 1) were represented. In groups of eight to 12, attendees spent five sessions discussing Georgia AIM’s equity-related goals and operations (Table 1). Each group’s discussion was led by a facilitator and recorded both via audio recording and by a human notetaker. Attendees also anonymously filled out their own perspectives on individual worksheets with sections corresponding to each session, which were collected by the authors at the end of the workshop.

**Table 1:** Equity workshop session topics and framing questions.

<i>Session 1: Defining Participation.</i> How should participation in Georgia’s manufacturing economy be defined? What is and is not participation?
<i>Session 2: Defining Equity.</i> What would it mean for the manufacturing economy in Georgia to be equitable? How can we know whether or not manufacturing in Georgia is equitable? What does equity not include?
<i>Session 3: Equity Failure Modes.</i> In what ways could GA-AIM fail to advance equity? In what ways could GA-AIM inadvertently increase inequity?
<i>Session 4: Opportunities for Improvement in Equity.</i> What could or should GA-AIM do to better advance equity?
<i>Session 5: Assessing Equity.</i> How should GA-AIM define and assess whether its projects are advancing equity? Think both about metrics, and about priority areas for detailed investigation of what’s happening on the ground.

Workshop audio recordings were automatically transcribed using the transcription service Otter.ai, and transcripts were manually corrected by research personnel with assistance from notetakers’ written notes. Research team personnel analyzed group discussion transcripts and individual worksheets via iterative, inductive thematic coding using the qualitative data analysis software NVivo 12. During coding, two research team members identified and consolidated attendees’ answers to each session question and noted important points of agreement and disagreement. In line with the workshop overall, the coding process aimed to collect insights of use to Georgia AIM leadership and operations personnel on Georgia AIM’s equity goals, the project’s opportunities and challenges in pursuing those goals, and ways to assess whether Georgia AIM is meeting its goals. As the objects of analysis were transcripts of conversations, it would be impractical and artificial to attempt strict quantification of the prevalence of different themes in conversation. Rather, we provide a detailed review of discussed topics relevant to the goals of the sessions, with qualitative language indicating the prevalence of each topic.

## Results

### *Session 1: Defining participation in Georgia’s manufacturing economy*

As Georgia AIM is intended to equitably increase participation in Georgia’s manufacturing economy, the workshop’s first session aimed to clarify what “participation” meant. Spoken discussion identified five interrelated concepts of participation among Georgia AIM project leads and personnel:

- Engaging in economic activity in or affecting Georgia

- Having opportunities to participate in manufacturing in or related to Georgia
- Manufacturing-related education in or related to Georgia
- Feeling involved in manufacturing in or related to Georgia
- Making a positive contribution to Georgia communities through manufacturing

Several of these categories go beyond both core manufacturing activities and material behavior, into manufacturing-adjacent economic activity, preparation for manufacturing careers, and even attitudes toward manufacturing.

### *Participation as economic activity*

When discussing economic activity, attendees agreed that manufacturing firms and their workers operating in Georgia participated in the state’s manufacturing sector. They also identified manufacturing entrepreneurs and technology developers in Georgia as clear participants. However, several attendees argued that all activity in society directly or indirectly relates to manufacturing. Other attendees posited different degrees of participation in manufacturing, with manufacturing workers and firms constituting a core of “direct” participation surrounded by “indirect” participants such as workers and firms in the manufacturing supply chain, retailers of manufactured goods, purchasers of manufactured goods, and taxpayers who support infrastructure or policy instruments affecting manufacturing. Attendees disagreed about whether persons supported by a family member working in manufacturing should themselves be counted as participants in the manufacturing economy.

Whatever the set of activities defined as manufacturing participation, several attendees asserted that there should be “no barriers” to participation—that persons of all backgrounds and demographic characteristics have equal opportunities to enter, work in, and advance in manufacturing—attendees said more about this in Session 2, summarized below. One attendee also noted that promoting participation in Georgia’s manufacturing economy requires prioritizing service to and opportunities for businesses local to Georgia.

One category of activity heavily emphasized by attendees was education. Attendees argued that both instructors and students in manufacturing-related education—including not only direct training but even generic K-12 science, technology, engineering, and mathematics (STEM) education—should be thought of as participants in manufacturing, or at least as persons engaged in activity essential to driving increased manufacturing participation. It was noted that such education could lead to many outcomes or careers beyond manufacturing, but attendees did not view this as a problem. Rather, most seemed to operate on the assumption that pursuit of STEM careers, whatever the field, will advance the well-being of individuals and of communities alike.

Attendees did not limit their understanding of participation in manufacturing to material behaviors. They also stated that their Georgia AIM projects aim to promote positive feelings towards manufacturing, including, most prominently, awareness of opportunities in manufacturing. It was not clear whether attendees wanted to promote positive feelings toward manufacturing only because such feelings could promote behavioral participation; or whether they felt that positive feelings themselves constituted a form of participation. Several attendees suggested that there are many opportunities for work and for community development through



manufacturing of which many Georgia residents, particularly in underserved communities, are unaware. They also argued that perceptions of manufacturing careers as dirty, dangerous, and insecure are outdated.<sup>1</sup> One attendee distinguished between engagement with manufacturing actively intended to support manufacturing and reluctant engagement undertaken for economic survival:

“If you’re part of workforce policy, technology development, deployment, education, community development, or commerce and trade . . . you’re participating. But if you’re against [manufacturing], and you’re trying to not support it, I would say that’s not participation, even though you may have to sustain yourself or others by participating.” (Attendee 17)<sup>2</sup>

In short, many attendees stated that Georgia AIM should not only increase direct participation in Georgia manufacturing but also promote awareness of and positive feeling toward manufacturing in Georgia—which may, of course, be expected to engender direct participation.

#### *Participation as positive contribution to Georgia communities*

A few attendees raised a further aspect of participation, based not only on variety of activity but on community engagement and outcomes. These attendees regarded participation as a sort of citizenship. In their view, participation requires positive collaboration with and contribution to communities in Georgia, not merely operation in Georgia:

“Participation is not getting what I can get for myself out of the deal. Participation is broadening your perspective and saying, what’s good for the region, you know, what’s good for the overall infrastructure of the community that I live in? And there are some companies that do that, that just say, ‘Hey, here’s an opportunity for me to go in, operate in my silo, not talking to anybody, not relate [sic] to anybody, let me get it while the getting’s good.’ But they don’t have that broader perspective. And then people notice that. They do. So it’s not just getting what you can get out of it. It’s oftentimes, what can you give? And not just what you can get.” (Attendee 2)

These attendees anticipated concerns discussed more extensively in later sessions, suggesting that some sorts of manufacturing or business practices may not be good for Georgia communities. However, there was little detailed discussion in this or any other session about whether or how Georgia AIM can ensure that the manufacturing it promotes makes positive contributions to the communities where it occurs and the persons with whom it engages. Indeed, many attendees took such contributions for granted.

---

<sup>1</sup> Some participants pathologized disinterest in manufacturing, viewing it as a product of ignorance, lack of support, or lack of confidence. Other participants suggested there may be legitimate reasons for Georgia residents to be hesitant about manufacturing, as discussed further below.

<sup>2</sup> Each quoted attendee has been assigned a randomized label for anonymity.

### *Participation discussion summary*

Georgia AIM personnel view their mission to increase manufacturing participation in Georgia in expansive, and somewhat diverse, ways. However, there is a clear core conceptualization—operating and working in manufacturing firms—to which the indirect, educational, and attitudinal aspects of participation contribute. Different attendees drew the line between “direct” and “indirect” participation differently, but most recognized both categories; and that Georgia AIM’s activities are largely focused on direct participation and pathways into direct participation. The only potentially major tension was that suggested by the narrower definition of participation as positive contribution to Georgia communities. Does Georgia AIM intend to promote all manufacturing in Georgia, or only that which assists Georgia communities in meeting their needs and advancing their values? Some attendees appear to feel that these two categories are one. Those who do not will need to consider how such community-oriented, beneficial manufacturing can be incentivized compared to manufacturing that aims only to “get” and not to “give.”

### ***Session 2: Defining equity in Georgia’s manufacturing economy***

The workshop’s second session focused on understanding the “equity” aspects of Georgia AIM’s goal to equitably improve participation in Georgia’s manufacturing economy. In spoken discussion, attendees stated that Georgia AIM should improve equity across demographic groups in Georgia, regions of Georgia, and different sizes of manufacturer operating in Georgia; and that equity improvement would consist in making more widely accessible a variety of resources, opportunities, capabilities, and powers across these groups.

### *Equity in active participation*

Interestingly, only one attendee explicitly mentioned that Georgia AIM’s definition and operationalization of equity might be constrained by Georgia AIM’s grantor:

“This is an Economic Development Administration grant given to us by the Department of Commerce. We have to keep that lens in focus . . . we need to make sure that the EDA equity priorities are being met in our full work. . . Their two main priorities are traditionally underserved populations, so that’s going to be down to race, identity . . . , underserved communities in terms of geographic [sic]. . . .” (Attendee 4)

Georgia AIM’s grant documents explicitly target several underserved groups for impact:

- Small business enterprises
- Women
- Black or indigenous persons and other persons of color, with a particular focus on Black persons
- Disabled persons
- Veterans

- Residents of rural and economically distressed counties

Attendees stated that equity would involve increasing the participation of these and other groups in Georgia's manufacturing economy, explicitly adding Hispanic persons to the category of underserved racial groups. Several attendees stated that achieving equity in the manufacturing economy would mean that proportions of these groups in the manufacturing workforce, and in manufacturing leadership and ownership, would match those in the general Georgia or local community populations. Some also went beyond Georgia AIM's grant documents, stating that equity should include supporting veterans' families; older citizens and workers; and formerly incarcerated persons. In their written worksheets, some attendees also specified LGBT populations, persons of low socioeconomic status, and persons of marginalized religion.

However, attendees did not limit their account of equity to workforce participation. Attendees argued that equitable workforce participation would require equity in access to jobs, STEM and manufacturing-oriented education, and several additional services that permit or facilitate such access, such as childcare, transportation to work or school, internet access, and even parental support. Interestingly, some attendees felt that artificial intelligence could help to improve equity in access to some of these resources, e.g., by lowering the cost of childcare or by facilitating transportation planning. On the attitudinal side, some attendees argued that equity requires that all persons feel that they could pursue any given career, and that interest in technology be more widely distributed across demographic groups and communities. As discussed more extensively in later sessions, some attendees wrestled with the difficulty of promoting STEM education and careers without devaluing other pathways or pressuring people into STEM.

### *Equity in harms and benefits of manufacturing*

Beyond mere participation in manufacturing roles, however, several attendees took broader views of equity. One attendee argued that workforce participation is only a means to the ends of autonomy and good lives:

“There is a quality of life discussion that does not happen as much as it should. . . We talked about whether or not people, you know, have childcare and can come to work. There's also, depending on where you're at in Georgia, there are some communities that don't want both parents to work, right? And offering the competitive wage, I think is incredibly important—offering . . . an improvement in quality of life in general, whichever path a family or a person chooses, I think is important to equity. . . These people, you know, have lives outside of these jobs. And that, if you just wring them dry at work, that's great for the employer. But it destroys your workforce long term. . . And so the quality of life side of it, I think, is an important portion of equity also. . .”  
(Attendee 7).

This same attendee was also concerned that the benefits of increased manufacturing activity in Georgia flow equitably and over the long term to Georgia communities and populations:

“The other side of equity in manufacturing, I think is having that stability, and that growth and that payoff that can’t easily be taken away, whether it be jobs being moved out of the state or workforce wanting to move to another state. . . You’re looking at, are the tax policies appropriate to enable us to keep people here? You know, when they moved a large proportion of film production and other things here, they caught massive tax breaks that have not largely pumped money back into the state of Georgia—but in some cases have caused Georgia a lot of burdens, and, in other cases, there’s advantages to it. . . As we roll these things out, we think about the long term plans and effects so that we have return on that investment, and then we have ownership as the state of Georgia, and we’re not just farming ourselves out for a quick opportunity that eventually benefits a company in California or New York instead of Georgia, right?” (Attendee 7).

Other attendees argued that equity requires minimization and fair distribution of any downsides of manufacturing—in particular, resource extraction and pollution:

“Are we looking at the land, looking at resource consumption, looking at waste, looking at byproducts and sustainability? Looking at where stuff is gonna get disposed? Are we disproportionately affecting impoverished neighborhoods, which tend to correlate with race and other things like that. . . How are we getting ahead of the sustainability piece, right? How are we looking at these byproducts environmentally? How are we prioritizing the future and not just the present? . . . [For example, say] we’re building a factory, polluting a river—I’m using old school, you know, preconceived notions, but I think they’re still valid—somewhere and saying, Oh, don’t worry, you’ll get more jobs. Meanwhile, people are getting sick.” (Attendee 14).

A few attendees discussed whether equity in manufacturing is a zero-sum game. At least one clearly felt that achieving equitable representation of and benefits for historically underserved groups and communities from manufacturing would have impacts for incumbents:

“There’s going to have to be significant sacrifice from the incumbents, if we want there to be equity. All of us are sitting around this table, because our parents probably made good decisions. Well, we can’t say that for everybody in the state. So if we want there to be equity, that means that all of us are going to have to donate time, we’re gonna have to sacrifice resources, we’re gonna have to give up something to get that equity. We’re looking at a hundred percent pie. So in order to bring up one part, we’re gonna have to give up something.” (Attendee 9).

However, another attendee, in another group, directly disagreed:

“I think [equity is] adding more, not less. Yeah, it’s not taking away boys’ opportunity to [learn about AI]. It’s saying, on top of them being there, also make sure we have all these other people too.” (Attendee 1).

In addition to discussing what individuals needed to participate in and to benefit from manufacturing, several attendees also discussed what communities and firms need to pursue manufacturing. Several attendees argued that geographic equity in manufacturing will require more communities to have necessary workforce, physical infrastructure, and government support for manufacturing:

“For me, equity is really just fairness and equal access to resources that I need to do my job to run my company. . . how are you going to get the workforce, I can get cheaper property here, but I don’t have the people.” (Attendee 20).

“Land use is huge. . . There’s been a big pushback on solar fields. . . It’s more on the county level, county commission, where they say, no more solar fields in our area, like it’s taking away our farmland or whatever. But at the same time, like, if a developer wants to come in and build, you know, 30 housing units or whatever on that same piece of land? ‘Oh, yeah, absolutely’” (Attendee 4).

#### *Equity in autonomy and decision-making about manufacturing*

This last comment suggests the final, and most contested, aspect of equity discussed by attendees: equity in decision-making power and autonomy. As quoted above, one attendee argued that equity requires autonomy, including the economic security to choose whether all members of a family will work. On the community level, some attendees argued that equity consists in part of distribution of decision-making authority about whether and how manufacturing will proceed in a community or how a firm will proceed:

“I think my takeaway is that this exercise modeled exactly what equity is about. You got so many different people at the table and everybody got the opportunity to voice their concerns and provide input into the process.” (Attendee 2).

Attendees struggled with whether and how individual or community decision-making power can be equitably distributed and maintained within the broader economic environment.

“There’s always going to be portions of our population that choose not to participate in the new technology. If you look at the Amish and Mennonites, are you ever gonna get them into artificial intelligence? Not likely.” (Attendee 3).

Attendees expanded upon this theme in the session on potential equity failures in Georgia AIM. Moreover, some attendees recognized that Georgia AIM’s work in promoting manufacturing could potentially work against or constrain individuals’ or communities’ decision-making power:

“As it relates to technology, playing devil’s advocate, I don’t know how much cooperation can exist, because, one could argue, if we’re looking at upskilling the

workforce, there are just certain requirements, right, for that goal to be achieved. And they're really at the point, it's more of, are you willing to be trained, educated to get to this point or not? . . . There are going to be communities that will directly or indirectly be excluded." (Attendee 19).

Another attendee argued that Georgia AIM can support autonomy by informing persons and communities about advanced manufacturing, but not pushing them into it:

"It starts with equal access to technology, so that there's equal access to information. People can make informed decisions, but I think where it looks like it might inadvertently increase inequity, is pushing people into things . . . if they have equal access to information and technology to make their own decisions, and their local officials say, We don't want to, I think that's where it stops. . . You're always gonna have people that are like, 'No, we've been farmers. And I understand that's not what I have to do, and I understand what everything else looks like. And I still want to do that.'" (Attendee 8).

However, as the above attendee observed, information can require investment of time and effort, in learning about, working with, and even acquiring new technologies, which may make it more difficult to say no. Moreover, it is unclear where the line between information and persuasion stands, given Georgia AIM's explicit mission to promote manufacturing. One attendee pointed out this tension explicitly:

"Is everyone saying that the community needs a voice, and they don't have a voice today, but we're also saying that we've got to train the community to think differently?" (Attendee 17).

But another attendee did not view this as a serious problem:

"I think more informed, right? Like, if your decision is your decision, that's good, but if it's based on a knowledge base that's no longer accurate, or incomplete. . . I did have participation in decision making under my equity piece, right? . . . We need partnership, we need buy-in, and that involves a certain amount of capacity-building and trust-building and knowledge-building, but that doesn't mean, 'And by the way, vote this way,' right?" (Attendee 14).

Attendees offered few verbal opinions about what should not be considered equity. However, at least one attendee voiced concerns that pursuit of equity could lead to loss of quality in workforce or in products:

"I would say equity is not adopting inferior products or services just so you can say, everybody was involved. . . Sometimes what you may have to do, like you said, is meet people where they are, and maybe even establish a mentor protégé relationship with a

company that wants to contribute, but maybe is at a different starting place . . . to help bring that company along.” (Attendee 2).

On their written worksheets, some attendees stated that equity did not mean providing identical opportunities or resources to all regions or communities; rather, it required tailoring support to each community’s or individual’s needs. Also in worksheets, some attendees noted that achievement of equity required more than mere quota-filling or box-checking, but instead involved building inclusive pathways to success across manufacturing. A few attendees stated that receipt of “unearned benefits” was not equity, but they did not provide examples of what this might mean.

### *Equity discussion summary*

In summary, attendees agreed that increasing equity in manufacturing includes increasing access, across demographic groups, regions, and firms, to the material, educational, infrastructural, policy, and even interpersonal and psychological resources and opportunities necessary to participate in manufacturing in Georgia. Some attendees argued that equity also required fair distribution of costs (e.g., pollution, health costs) and benefits (e.g., money, leisure time) of Georgia manufacturing across demographic groups, and between firm owners and employees. Only a few attendees discussed the question of whether increasing equity in such access would require sacrifice from historically advantaged incumbents; those that did address this question disagreed. Some attendees also argued that equity requires autonomy and decision-making power for individuals and communities.

Attendees were not clear on what would be required for decision-making power about whether and how to pursue manufacturing to be equitably distributed. Several attendees argued that autonomy requires that individuals and community leaders be educated about new technologies. Some felt this was unproblematic, but others found the line between education and persuasion uncomfortably blurry. Finally, attendees offered limited comments on what ought not to be considered equity, but some comments included sacrifice of quality for the sake of inclusion; provision of one-size-fits-all opportunities; quota-filling; and provision of (unspecified) unearned benefits.

### ***Session 3: Potential failure modes for Georgia AIM’s equity goals***

Session 3 asked attendees to envision potential pitfalls for Georgia AIM’s equity goals—ways that Georgia AIM could fail to improve the equity of Georgia’s manufacturing economy, or even worsen inequity. These pitfalls were not confirmed failures occurring at the time of the workshop. Rather, Session 3 was intended to be akin to a “red-teaming” exercise, identifying ways that Georgia AIM could potentially fail so as to support efforts to avoid such failures.<sup>3</sup> We have organized the potential pitfalls identified by attendees into two categories: a large set of

---

<sup>3</sup> “Red-teaming” is a “...structured testing effort to find flaws and vulnerabilities in an AI system...” ([Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence](#), Sec. 3(d), The White House, October 20, 2023).

“operations failures,” referring to ways that Georgia AIM could fail to effectively design and execute its programming; and a smaller, but also important, set of “adverse consequence failures,” i.e., ways that Georgia AIM’s programming could harm people if executed as planned.

*Potential operations failures: Goal definition and alignment*

Attendees discussed three main subcategories of potential operations failures. The first encompassed problems with goals. Despite the grant’s explicit focus on equity, some attendees felt that Georgia AIM could potentially ignore its equity goals or fail to identify or target some groups that could benefit from Georgia AIM programming (though, aside from those mentioned above, attendees provided no examples of such groups). Some attendees suggested that an unclear definition of equity could permit Georgia AIM personnel or programs to disregard equity goals. On the other hand, many attendees expressed concern about prioritizing metrics over outcomes, i.e., of simply searching for the easiest way to maximize measurable interactions with persons of target demographic groups rather than for ways to ensure that Georgia AIM has lasting and beneficial impacts on such persons’ lives:

“I realize that we could probably go to a few conferences and hit all of our KPIs [key performance indicators] really easily. But I think if we do that with existing programs, it’s going to advance inequity, because we’re not going to, like, stretch ourselves. . . We have to find ways to challenge ourselves to make the KPIs really powerful. And so we’re coming up with, like, what is a real engagement? You know, did you just walk up to me, you know, at a busy session with a bunch of other people, and I talked to you for five minutes and you did a survey? Or did I actually captivate your attention and get you to believe something that you didn’t know when you came up to me today?” (Attendee 9).

Several attendees expressed concern about Georgia AIM’s broader process for setting and recalibrating goals throughout the project, arguing that Georgia AIM must continuously work to align its goals with stakeholder needs:

“I think one of the biggest pitfalls of equity failure would be not being plugged in and staying calibrated, in terms of our efforts, to a diverse group of stakeholders, right, and understanding who those stakeholders are. Because it’s not just policymakers, it’s not just academia, or, you know, community leaders, it’s all of the above. . . You should be recalibrating and getting input from your stakeholders . . . Identifying the stakeholders and giving them a voice is critical. Because we in academia are notorious for having pet projects we just want money for so we can develop what we think is cool, or we think is great. And if there’s not appropriate or real-world use case or application for it, then we’re ramming our own ideals and ideas down people’s necks at the expense of all the taxpayers, right.” (Attendee 7).

“I think also ensuring that there’s something that comes behind whatever it is you’re asking people to do, not just making assumptions about, you know, coming into a



community without thinking about what they need, or you trying to tell them.” (Attendee 12).

As discussed further below, some attendees felt that Georgia AIM could harm communities through zealous or arrogant pursuit of its own goals rather than communities’ needs.

*Potential operations failures: Project administration and management*

The second subcategory of potential operations failures concerned basic project operations and administration. By far the most common theme in this category covered the sustainability of Georgia AIM programming. Many attendees were concerned about whether Georgia AIM’s programs would continue after its four-year initial grant period, which they viewed as too short to achieve its broader aim of transformation in Georgia’s manufacturing economy. Some attendees also feared that failure to coordinate across the Georgia AIM subprojects could lessen Georgia AIM’s impact. As discussed further in the “opportunities” session below, attendees wanted to know more about one another’s projects and events so that they could cross-advertise programming and help route partners or engagement audiences to Georgia AIM projects best suited for their needs. Several attendees also expressed concern about lack of reflexivity and continuous evaluation of outcomes in the project. They argued that Georgia AIM should constantly be assessing whether its activities are in fact contributing to its goals, looking for groups left out and ways to improve. Finally, one attendee was concerned about lack of regulation and financial oversight, though it is unclear whether this attendee was concerned about Georgia AIM, the organizations it serves, or the broader manufacturing economy.

*Potential operations failures: Outreach, relationship-building, and programming design*

The third subcategory of potential operations failures covered weaknesses in Georgia AIM’s outreach and programming. Many attendees were concerned that Georgia AIM could fail to specify its programming to Georgia’s variety of groups and communities. They conceived of this failure in two main ways. The first emphasized tailoring messaging to appeal to different groups in Georgia:

“With labor, enrollment posting, job postings too, like, certain language will put off people from even applying or wanting to enroll in certain programs. So you’ve got to make sure you’ve got the right outreach and the right language in place to draw people in. . .” (Attendee 6).

“You know, it’s even—I just think of companies. You notice that the advertisements that they use and the faces that are on those is different for the culture that they’re trying to advertise to. Even the body shapes you see, you know, of the makeup, and the models, they’re different upon the culture that they’re doing the marketing to. It’s the same product, but they no that in order to reach that culture, they need to have a different

representation that's consistent with that culture. And I think that when we lose that, the awareness of that, the importance of that, that's when we'll lose our ability to be able to go out there and maintain equity . . ." (Attendee 2).

The second conception of tailoring programming included not presentation of "the same product" with different marketing, but actively adapting programs to circumstances. Attendees were concerned about creating "one-size-fits-all" solutions. Few attendees specified what this could mean, but at least one provided an example:

"I think if we're targeting underserved communities and teaching them to go get a two-year degree, go get a manufacturing job, period . . . we're pigeonholing entire underserved communities to not pursue, you know, higher education. . . We need some people to go above and beyond. Go beyond that. So yeah, we don't want to walk into an entire town and be like, 'You guys are all going to work in manufacturing.'" (Attendee 11).

Several attendees were concerned with Georgia AIM's outreach more broadly. Some suggested that Georgia AIM could simply fail to perform enough promotion or to align the messaging of different subprojects with one another. Others noted that Georgia AIM could fail to build trust with certain communities, either by affiliation with distrusted organizations or by failing to model the practices it promotes:

"I have to add suspicion of the ivory tower. So I went to school in the south. And our professor used to say, 'Oh, those ivory tower boys.' Whenever we had to read textbooks from the outside world, 'These ivory tower boys, they don't know anything about the real world.' And so there is an inherent, built-in suspicion. The word federal government, immediately no. Immediately. Anything to do with, you know, Georgia Tech is coming in to northeast Georgia, to tell me what to do. And it's, it's deep seated." (Attendee 1).

"Telling the companies, 'Hey, you need to have all these things and inclusion, you need to have a maternity leave policy,' but, like, we as the state, as a university system, only give moms three weeks, like, they're gonna grin, like, 'Really, you're gonna lecture us on maternity leave policy?'" (Attendee 18).

Several attendees expressed concern that Georgia AIM's efforts to make its programming accessible to underserved groups could be insufficient, but, unfortunately, they did not specify particular ways in which such failure could occur. Finally, a few attendees were concerned about the appropriateness and applicability of education provided through Georgia AIM, arguing that curricula would need to be continuously evaluated and updated to keep up with changes in technology.

### *Potential adverse outcomes failures*

Attendees also identified several ways in which Georgia AIM's planned activities could potentially harm Georgia communities. They expressed concerns about adverse workforce impacts, including due to AI; about the possibility that Georgia AIM could benefit firms, but not communities; that Georgia AIM could widen the gap between small and large companies; that Georgia AIM could coerce or manipulate people into manufacturing when their true interests or passions might lie elsewhere; and that Georgia AIM could reduce or disregard opportunities for groups that don't want to fully adopt advanced manufacturing or artificial intelligence.

Attendees spoke most about potentially adverse workforce impacts from Georgia AIM. For several attendees, bias in AI recruiting was top of mind:

"If you look at the Amazon resume AI example, right, when they had an AI system effectively tell them, what should the applicants be, it turned out to be quite wrong, right? So they were probably more efficient. It's certainly less resumes. But at what cost did that come?" (Attendee 12)

"AI systems are designed by somebody, and so if that person has implicit biases, it's gonna go through saying, this is the ideal worker, and they have these skills, and they've gone to these colleges, not realizing there's already systemic inequities that are affecting who has those skills or has gone to those colleges." (Attendee 18).

On the other side, some attendees were concerned that Georgia AIM might take away opportunities for groups that have been historically advantaged:

"I think like, if we're check, trying to make sure we have enough veterans or females or whatever, like that, that goes completely—I mean, yes, that goes to equity in terms of how—whatever, but at the same time, there could be a whole table of, you know, cute boys that just wanna learn about AI. And it's okay, and it has to be okay. That it might be a whole table of white boys that want to learn about AI, and that has to be okay." (Attendee 4).

Several attendees were concerned that Georgia AIM could lead communities or workers into industries that will soon become obsolete, or only temporarily attract firms that will soon leave again:

"What happens if we push these communities into this very specific manufacturing subset of roles and all of a sudden they're obsolete in five years? Haven't we created a major inequity?" (Attendee 15).

"I've seen manufacturing come in. Wasn't a real good fit. It caused some jobs. As soon as that kind of played out, they leave. And the community was back down where it was before they came, and still struggling even to this day, wondering what happened. So it

has to be a commitment on both sides. . . We're committed to educate our young people to go there. . . But if you haven't done anything for the community that you've built there, then you're actually, really hurting more than you are helping." (Attendee 10).

In a similar vein, one attendee was particularly concerned that Georgia regional or state governments could implement policies that would benefit firms but not communities:

"I think there are, are issues at the local, the county, this—the region, the state level, the federal level, but then also with certain deals that are made within the state that benefit manufacturers or benefit companies, and ultimately do so at the expense of the community or the employees long term. It looks great for the politician and the deal makers in the moment. But it really has dire consequences for that community and the workforce that are picking up the burden of the taxes in that community or other things that that company should have been paying, probably. . ." (Attendee 7).

Some attendees also expressed concerns that AI could eliminate livelihoods or ways of life by making them economically inviable, as in this exchange between two attendees:

Attendee 4: "My Mennonite bakery can continue to make their baked goods the exact same way they always have. They don't need any technology."

Attendee 3: "But the agricultural technology is going to leave them behind because it's actually going to be less expensive in the industrialized agriculture than it will be with the way they're growing things. So they've always had to look religiously at how they can incorporate technology in what they're doing it is how they do that. They haven't incorporated tractors and stuff like that. So as we move into more artificial intelligence, drones and AI to decide where to put pesticides and herbicides, you're gonna get more industrialized agriculture and it will become less, they'll be less able to do that. So how do you then transition society?"

This attendee offered a more expansive concern that the advanced manufacturing economy could fail to make space for communities that don't want to adopt advanced manufacturing technologies, leading to backlash:

"When we had the first industrial revolution, the problems that led to the Luddites was that they didn't engage that part of the population and expected everybody to transition to the new way of doing things and didn't work with them to try and bring them up . . . So that was one of the things that I think in this fourth industrial revolution that we're doing is we're engaging multiple areas of society. But we always have to be mindful that some of the population, a portion of the population will choose not to participate. And we have to be good with that, that's fine, and help to get them engaged in society and get them opportunities, even though they're not participating in that portion of it. Again, if you look at the Amish and Mennonite communities, that's a great example of how they

integrated themselves into the new technologies, even though they're using some.”  
(Attendee 3).

However, as excerpted above, these same attendees had previously discussed the possibility that advanced manufacturing could push certain livelihoods or ways of living out economic viability.

In a related vein, several attendees expressed concerns that Georgia AIM could manipulate or coerce people into advanced manufacturing. In the words of one attendee:

“It wasn’t until [other attendee’s] pushback that I thought, well, maybe, maybe there’s arrogance in assuming everyone wants to be upskilled. Maybe there, maybe the equity is ensuring we’re able to meet the employee workforce where they are and where they are not. . . Not colonizing, that’s the word, colonizing people. Say, well, this is the movement, get on board or be left behind. Maybe the left behind is just leaving them where they are, and they can still make a meaningful contribution. . . I started out in the art world . . . and then I changed and did tech and cybersecurity—very long story. And I was recruiting women to work in STEM and tech, and my sister pushed back on me and she said, here’s the thing, just because you are persuasive, and can convince other women that this has great opportunities, where you, yourself wanted to be in art. And that was your passion. And she’s like, just because you found these other things. She’s like, just be thoughtful about the fact that just because you are persuasive, doesn’t mean that you’re guiding them in the best direction for them.” (Attendee 1).

However, attendees did not see much difficulty in presenting opportunities and promoting advanced manufacturing without coercing or pushing persons into it—despite the economic pressures discussed by other attendees in the same group, excerpted above:

Facilitator: “Where is that line between offering opportunity, and persuasion, and maybe even . . . coercion? Like, how do we—”

Attendee 17: “Offering that opportunity and make, making sure that it exists, and it’s open for anyone, but . . . we brought up over and over that you’ve got to meet people where they are, but don’t try to unduly influence them.”

Attendee 1: “The ethics that we all carry. We’re all sitting here looking at our own work and like, okay, I feel strongly about this. But objectively, what does somebody else think? What are my colleagues saying? Where am I potentially wrong? Where am I potentially arrogant?”

Finally, one attendee worried that Georgia AIM could create a larger divide between small and large firms, though this attendee did not expand on this point.

### *Potential failure modes discussion summary*

Attendees articulated a wide variety of ways in which Georgia AIM could potentially fail to deliver on its equity goals or could even worsen inequity in the manufacturing economy. On the operations side, some attendees were concerned about potential failures to set clear goals, to align goals with stakeholder needs and values, or to prioritize achievement of actual impact as opposed to merely meeting metrics. On the project administration side, attendees worried about failures to achieve project sustainability, to continually assess outcomes, to coordinate within the project, or to ensure that use of project funds aligns with project goals and prevent graft or embezzlement. On the programming side, attendees expressed concern that Georgia AIM might use ineffective messaging, fail to gain trust, fail to tailor programming to the various contexts where it will be deployed, or deploy inadequate or out of date pedagogy.

On the adverse outcomes side, some attendees worried that Georgia AIM could contribute to workforce losses in the immediate or near-term or worsen current biases in recruiting. Some attendees were concerned that Georgia AIM could promote policies, such as tax breaks for large firms, that would benefit such firms at the expense of Georgia communities. Attendees also expressed concerns that promotion of advanced manufacturing could take away the livelihoods or ways of life of communities not interested in advanced manufacturing. Some attendees expressed concern about themselves pushing people into manufacturing, but they felt that individual care was sufficient to avoid this outcome. Finally, one attendee expressed concern that large firms might benefit more from Georgia AIM than could small firms.

### ***Session 4: Opportunities to improve Georgia AIM's equity outcomes***

In Session 4, attendees discussed opportunities for improving Georgia AIM's equity outcomes. Attendees were asked to focus on actions that Georgia AIM was not undertaking at the time of the workshop. However, attendees often had limited understanding of one another's projects, thus, suggested actions that other parts of the Georgia AIM project were already undertaking. Other attendees simply discussed what their projects were already doing to advance equity or made broad statements about best practices in economic development programs.

Because of these ambiguities, we organize attendees' comments by the goals for improvement they identified. These included:

- Aggregating and sharing Georgia AIM's knowledge within and without the program
- Aligning Georgia AIM activities with diverse local needs and opportunities
- Reaching diverse communities with Georgia AIM communications and programming
- Helping diverse persons and businesses to achieve economic success and advancement
- Achieving program sustainability beyond the initial Georgia AIM grant

### *Aggregating and sharing Georgia AIM's knowledge within and without Georgia AIM*

Many attendees expressed a desire to improve collection and sharing of knowledge developed in Georgia AIM activities both within and without the project. A large proportion of such comments expressed a desire for greater cooperation across Georgia AIM projects. Some

attendees expressed desires for additional meetings and channels of communication with other Georgia AIM projects to learn what one another are doing and exchange information on opportunities and best practices. Many attendees were particularly eager for Georgia AIM projects to collect and share success stories both within and without the project for purposes of impact demonstration and marketing. A few attendees went beyond this suggestion in reiterating the need to replicate successful Georgia AIM pilot programs in other locales over time. One attendee suggested a shared calendar or other mechanism to inform Georgia AIM projects about one another's events, so as to prevent internal competition and to permit cross-promotion of events. Finally, many attendees stated that Georgia AIM would need to continuously assess its outcomes and adapt its activities as necessary, e.g., to cover aspects of equity not successfully advanced by current programming.

### *Aligning Georgia AIM activities with diverse local needs and opportunities*

Many attendees also discussed the importance of aligning Georgia AIM's activities with the needs and opportunities of Georgia's diverse communities, which would require substantial adaptation to context. Attendees argued that programming needed to be adapted to serve different stakeholders, e.g., different localities or different sizes of firms. In the words of one attendee:

“It may not be practical . . . to put a new hydrogen fuel cell plant in downtown Atlanta, right. There's not the real estate. . . There's not a practical use case for that in the middle of the city, based on a whole number of things. At the same time, you know, something related to agriculture probably shouldn't be here. Yet there's a lot of workforce development opportunity. There's a lot of technical types of manufacturing that maybe the resources are appropriate here because there's certain types of transportation capabilities or logistics capabilities that they can make more sense here, where you don't need as much space, it's more vertical growth, or the technology . . . in the digital sense rather than equipment.” (Attendee 7).

Several attendees argued that one major difference across communities whom Georgia AIM needed to serve was their preexisting social and physical infrastructure. Attendees emphasized that Georgia AIM might need to perform substantial capacity-building to help communities deal with preexisting barriers to workforce or economic development. Several attendees argued that, because of Georgia AIM's nonprofit nature, Georgia AIM organizations could serve as “neutral third parties” providing credible advice and support to communities in dealing with preexisting problems. It should be noted, however, that many problems are beyond Georgia AIM's ability to directly solve. For example, several attendees discussed inequity in internet access across Georgia communities.

Many attendees argued that alignment between project activities and community needs and opportunities requires consistent communication and collaboration with project stakeholders, such as community leaders, manufacturers, and ordinary citizens. Such communication would permit Georgia AIM to draw upon stakeholders' knowledge of their needs and to build trust.

Attendees emphasized the importance of visiting communities in person and developing long-term relationships with locally knowledgeable and influential “ambassadors.” Other suggested mechanisms of communication included convening of or participation in community meetings, and formal readiness and needs assessments (e.g., cybersecurity assessments for firms). Several attendees argued that Georgia AIM activities should be guided by participatory decision-making in collaboration with intended beneficiaries. In the words of one:

“I do think that sometimes there’s a tendency to say, ‘Okay, we went and asked them, check the box, but we’re gonna do what we’re gonna do anyway.’ Which is kind of terrible. It’s worse than not doing it, not asking in the first place. So the opportunity for cocreation, for there to be the opportunity for the community to say, ‘I know you guys have great ideas, you have great things that you would want us to do. But actually, this is what we want,’ and support them in that.” (Attendee 5)

### *Reaching diverse communities with Georgia AIM communications and programming*

In a related vein, many attendees were concerned that Georgia AIM use effective outreach and communication strategies to reach diverse communities across Georgia. Attendees again reiterated the importance of building trust, in particular through sustained engagement, delivering on promises, and working through locally known and trusted leaders. One attendee argued that Georgia AIM should work to maintain relationships even with organizations or communities with which it has not yet chosen to partner. Several attendees argued that effectively reaching members of any given community requires a grounded understanding of how that community feels about manufacturing and why it does or does not express interest in it. One attendee argued that appropriate communication must avoid alarmism:

“A lot of what's going on with AI is like, the robots are coming, you better get ready. And it's like, there's a lot to be concerned about. Yet it's still, we can have a sober conversation about it. And it's like, when we apply the fear metrics--that might not be what we're intentionally doing. But if it's like, you gotta get on this, if you're not on this, you're gonna miss out, like, in a way that it's fear based, then . . . that's what the coercion comes in. And it's not an opportunity for you to choose, where there might be a child who their best contribution to the world is their art, it has nothing to do with AI.” (Attendee 5)

Several attendees argued that communities and manufacturers needed to be shown what was possible with advanced manufacturing. Many attendees felt that the general populace misperceives manufacturing as hard, dirty labor, but that the industry has changed; and that communities need to be shown what modern manufacturing jobs are like.<sup>4</sup> Similarly, a few attendees argued that some manufacturers believe AI to be a larger investment than it is, and that Georgia AIM can show manufacturers small, inexpensive, and easily deployed AI applications.

---

<sup>4</sup> It is unclear, however, how participants’ views of the “best case” of modern manufacturing relate to the reality of actual manufacturing jobs in Georgia.



Several attendees emphasized the importance of reaching out to young audiences through channels such as social media.

*Helping diverse persons and businesses to achieve economic success and advancement*

Many attendees discussed ways in which Georgia AIM can help diverse communities to achieve economic success through workforce participation and advancement. A few attendees discussed ways in which Georgia AIM could specifically help small businesses, e.g., by facilitating creation of mentorship relationships among firms and by advocating for tax policy helping small over large businesses. More attendees focused on assisting individuals in the manufacturing sector. Attendees reiterated the importance of developing diverse and appropriate educational pathways that could “meet people where they are,” and reduce barriers to career change. Attendees emphasized what can, depending on perspective, be described as the dynamism or the precarity of contemporary careers:

“It's not going to be the same as it was in the 40s, 50s, 60s, where somebody left high school, took a manufacturing job and did that job for 30 years and retired for a pension, and did it the same way every day in the same place every day. Maybe got a promotion once every 10 years into the next step up in the plan, right? Because the jobs are changing. . . You're not going to do the same job for 30 years. You're gonna do that job for a couple of years, that's gonna get automated replacement, some intelligent software, and now you're gonna be on to the next [job]. So we need education [that] is different too. That's why [the Technical College System of Georgia] is looking [at] microcredentials that happen consistently over life. You know, Georgia Tech is [also] looking – our professional education is almost bigger than the traditional university – thinking about, you know, how do we do 12 month degrees?” (Attendee 13).

A few attendees advocated for specific workforce mechanisms, including workforce matchmaking services (which Georgia AIM Project 5 is doing) and workforce development grants. Finally, one attendee argued that equity required helping persons to develop not only technical skills, but skills in teamwork and in responsible leadership and stewardship:

“Just because I'm underrepresented in STEM doesn't mean I'm inclusive, necessarily, right? Those are actually two different things. So, I think there's an opportunity, no matter who you're dealing with, to make sure that they know how to be teammates and they know how to hire them. They know how to manage, they know how to be leaders, that they are cognizant of the communities in which they're operating. But they're not so focused on the bottom line that they're dumping chemicals into rivers and things like that, right. So think there's an opportunity for like, some kind of inclusion or like, not just technical training, but like people training, so that we are creating responsible leadership and stewardship.” (Attendee 14).

### *Achieving program sustainability*

Finally, once again, several attendees discussed the importance of pursuing sustainability in Georgia-AIM project operations beyond the initial grant period:

“Like, let's have a strategy, like, okay, what are we doing in two months? Three months, sitting here? And five years? Are we going into the community as just a flash in the pan and then leaving? Like, do we have advocates that are going to remain in the communities? Like, are we going to have teachers, educators, like are we leaving, are we like planting someone there, like, short term long term, like five, ten years? Like, what's the plan long term?” (Attendee 16)

“Whatever lives on beyond the project, you know, I'm just still thinking about how do we know we were successful. And like, you have to still do this, you know, after this project is finished funding, we have to figure out how to spread this message and to be one unit. So whatever goes on beyond it, to me, is a success.” (Attendee 9).

### *Opportunities discussion summary*

Attendees discussed a wide variety of goals that could help Georgia AIM to improve its equity outcomes, alongside some suggestions for specific practices to pursue these goals. These goals included expanding aggregation and sharing of knowledge and coordination across the Georgia AIM project; alignment of Georgia AIM programming with local needs, capabilities, and opportunities across Georgia; tailoring Georgia AIM outreach, messaging, and programming to diverse target audiences across Georgia; and pursuing sustainability of Georgia AIM project operations after the end of the initial grant period.

### ***Session 5: Defining and assessing Georgia AIM's equity outcomes***

#### *Questions to answer*

In the final workshop session, attendees discussed ways to assess Georgia AIM's equity outcomes. In verbal discussion and on their worksheets, attendees articulated several questions that assessment should aim to answer, sometimes including specific metrics:

- Are Georgia AIM's programs sustainable?
- Are Georgia AIM's programs effectively and fairly reaching diverse communities across Georgia, particularly those targeted in the grant?
  - Number of geographic regions participating
- Is Georgia AIM removing barriers to workforce participation?
- Are manufacturing activity, AI use, and manufacturing jobs increasing in prevalence in Georgia?
  - AI use across firm categories

- Firm creation and survival rates
- Number of firms
- Manufacturing GDP
- Unemployment rates
- Are workforce participation and workforce advancement in manufacturing, and economic status, becoming more equitable in Georgia?
  - Training or education enrollment
  - Workforce participation and retention rates
  - Promotion rates
  - Firm ownership rates
  - Upward economic mobility rates
  - Wealth distribution
- Have specific persons, communities, and organizations engaged by Georgia AIM received and recognized value from those engagements?
  - Community population

### *Methods for evaluation*

Attendees articulated several qualitative and quantitative methods by which Georgia AIM's outcomes could be assessed. Many of the specific metrics above can be measured either through bespoke survey data or through preexisting surveys (e.g., tax data, sales figures), conducted by other organizations (e.g., the state of Georgia, firms). Attendees also suggested use of several additional methods, such as solicitation of stakeholder feedback through surveys, evaluative interviews, or focus groups. Many attendees were eager for Georgia AIM projects to collect and share anecdotal "success stories," though it is unclear whether attendees viewed this as a mechanism of evaluation or of impact demonstration and promotion. A few attendees had broader views about how assessment could be conducted. One suggested comparing the state of Georgia's outcomes along some of the above metrics to those of a similar state lacking a Georgia AIM-like economic development programming, while another suggested contracting assessments from external organizations.

### *Preferred evaluation practices*

Attendees offered several additional opinions about assessment needs and practices. Several attendees reiterated the need for periodic evaluation. One attendee suggested that evaluation methods and targets should shift over time as Georgia AIM's situation, and its understanding thereof, evolves. Several attendees also noted the importance of specifying metrics to context, and, in particular, comparing metrics against previous baselines:

"If I compare the demographics of my software development house against the general population, it looks bad. But if I compare it against the population of people graduating with electrical engineering, computer science and mechanical engineering degrees, I'm doing better, right? And so I think we need to extend that same idea, right. And we need

kind of what I call local baselines of manufacturing participants for each project . . . and then say, ‘Are we moving the needle closer from the inequity that exists within that locality or that project specific baseline further toward the general population of that locality?’” (Attendee 13).

### *Problems in evaluation*

Finally, attendees noted several problems in evaluation that could hinder assessment or could lead assessment to harm project outcomes. One attendee quite directly felt that evaluation simply got in the way of working toward project goals:

“So the more metrics that you add, the more time I spend building the metrics, the less time I’m in the community actually doing the stuff that we were targeted to do in the grant. So less metrics is better.” (Attendee 3)

Another attendee observed that excessive focus on evaluation could harmfully distort Georgia AIM’s activities:

“Goodhart’s Law states that when a measure becomes a metric, it ceases to be a good measure. . . Like, yeah, we need to check our boxes. Yeah, we need to report to EDA, but, like, are we just gaming the system to get those metrics, right? As opposed to measuring and sometimes saying, ‘Ahh, we’re actually not where we want to be.’ And learning from that. Which is way better, even if it doesn’t--way better for us as a state and as a community and all the things as opposed to like, well, we’d like to give all good news all the time to EDA.” (Attendee 14).

Other attendees noted the fundamental problem that metrics never directly track outcomes; for example, not all persons who attend a manufacturing-focused event will enroll in manufacturing education in the future. Several attendees argued that Georgia AIM’s overall goals will take longer than the initial grant period to realize, and so current outcomes tracking must focus on intermediate goals (e.g., capacity-building in firms or communities, training enrollment). Finally, a few attendees stated that assessment of Georgia AIM’s impacts across demographic groups is difficult because the demographic details of persons engaged or served by Georgia AIM may be difficult to discern or collect. Even when these details are collected, some Georgia AIM organizations (e.g., the Technical College System of Georgia) cannot report them due to privacy requirements. Attendees offered no clear solutions to these assessment problems, and indeed they are more conditions under which Georgia AIM must operate rather than temporary barriers that can be surmounted or resolved.

### *Evaluation discussion summary*

Attendees offered many suggestions for questions on which outcomes evaluation should focus, qualitative and quantitative methods by which those questions should be answered,

evaluation practices, and problems with evaluation. Attendees called for evaluation of both overall regional outcomes and the outcomes of specific projects; economic and broader community well-being outcomes; and both “hard” measures of outcomes and direct feedback from project stakeholders and audiences. Attendees suggested both quantitative and qualitative methods for evaluation, and suggested practices such as inter-state comparison and external contracting that could be used for evaluation. Finally, attendees observed a variety of ethical, epistemic, and resource constraints under which evaluation must operate, including the costs of evaluation, the tendency of evaluation to change the evaluated activities, and privacy-related data limitations.

### **Discussion: Four tensions in economic development**

Over the course of the workshop, attendees engaged in a wide-ranging conversation about Georgia AIM’s goals, prospects, challenges, and opportunities in advancing equity in Georgia’s manufacturing economy. Though workshop discussion focused tightly on the specific details and circumstances of Georgia AIM, attendees’ conversations illustrated four core tensions in technology-focused economic development—1) between promoting beneficial and harmful outcomes from economic development and novel technology; 2) between promoting a particular industry or technology and promoting equity; 3) between achieving and assessing impact; and 4) between frankly acknowledging these tensions to improve their navigation, and papering them over to garner support.

The first tension is that Georgia AIM’s programs are largely designed on the premise that manufacturing, manufacturing jobs, STEM careers, and the development and deployment of novel technologies all contribute to the well-being of the persons and communities involved. Accordingly, Georgia AIM attempts to ensure that all communities have the opportunity for involvement in STEM and manufacturing. Many attendees also seemed to take these premises for granted. However, others disagreed, arguing that some manufacturing jobs can be abusive or exploitative; that some manufacturing business operations can extract rather than add value to communities and persons; that some novel manufacturing technologies can increase gaps between demographic groups, socioeconomic strata, geographic regions, and large and small firms; and that some manufacturing operations can directly harm communities and their environments, e.g., through pollution.

Georgia AIM is designed to promote manufacturing, but some attendees suggested that it should only be promoting certain types of STEM work and manufacturing—those that make long-term positive contributions to the well-being of their communities. Relevant concepts included ideas of participation in manufacturing as a sort of citizenship, and a need for Georgia AIM to promote responsible stewardship of human communities and natural resources among workers, leaders, firms, and policymakers. Going forward, Georgia AIM will need to decide whether these views have merit, and, if so, how Georgia AIM can specifically promote societally beneficial manufacturing activity through its education and programming.

The second tension, closely related, is that between Georgia AIM’s goal to promote manufacturing and its goal to promote equity. Not all attendees perceived this tension, but some felt there was a difference between promoting the equitable self-determination and autonomy of

individuals and communities and promoting uptake of advanced manufacturing technologies. At base, conceptions of equity themselves stand in tension. For example, some attendees felt that equity improvement requires sacrifice from incumbents, while others did not. Moreover, some attendees were concerned that their professional work might inappropriately pressure individuals into STEM or manufacturing careers, or communities into accepting manufacturing activity that might compromise their ways of life or natural environments. More broadly, some attendees suggested that Georgia AIM's activities could contribute to economic shifts making some livelihoods and ways of life more difficult or outright impossible.

Will farmers be forced to adopt precision agriculture to survive, or rural communities to welcome large factories and land development? For whom, if anyone, will “welder” or “artist” remain a viable career? These attendee concerns raise broader questions about the capabilities and consequences of economic development. What would an economic development program intended to enhance the ability of persons and communities to live as they choose look like? If economic development opens up some forms of livelihoods and forecloses others, by whom and how should the modes and directions of economic development be decided upon? Can a concept of equity as equal access to genuine autonomy survive under the imperatives of international competition? These questions play out on the micro-scale as Georgia AIM personnel encourage young people to pursue STEM education and careers, and on the macro-scale as economic development plans supported by Georgia AIM push to reshape the economy of an entire U.S. state. Some attendees suggested that participatory decision-making with Georgia AIM stakeholders would help to align Georgia AIM's activities with the values and goals of Georgia communities, but the modes and impacts of such participation remained unclear.

The third major tension is that between achievement and assessment of impact. Too great a focus on assessment can add burden, distort activities, and fail to measure key outcomes (especially ones harder to measure). On the other hand, many attendees argued that such assessment is necessary to ensure that Georgia AIM's resources are being spent effectively, that adjustments are made when necessary, and that lessons from Georgia AIM's operations are captured and disseminated. This tension becomes more difficult to square given the deep uncertainty under which Georgia AIM must operate. Assessing the outcomes of interventions in complex systems, such as economic development programs, is difficult, and Georgia AIM's long-run outcomes will occur after the end of the grant period. Several attendees stated that Georgia AIM's most important contributions, in building technical and social capacity among Georgia communities, are very difficult to measure. They furthermore suggested that per-engagement measures of efficacy incentivize engaging with stakeholders already best situated to benefit from new technologies, not those that most need help. Complexity and diversity of the circumstances of intervention demand distributed judgment and decision-making, while accountability and large-scale learning over time demand standardization and simplistic, abstract assessment. This is a spectrum, not a hard dichotomy. Nonetheless, Georgia AIM will have to decide where on that spectrum—and with what balance of trade-offs, certain and uncertain—it can best serve Georgia's communities.

The fourth major tension is that it is difficult for anyone involved in economic development to be unaware of the aforementioned tensions, but equally difficult for such persons to explicitly acknowledge them. Composing and launching any large project requires garnering

support from a diversity of constituents and promising the potential to achieve funder goals (which may stand in tension with one another). It may harm a project's chances of support or funding to explicitly acknowledge that it may facilitate adverse as well as beneficial economic activity, that two of its goals (e.g., advancing equity and promoting advanced manufacturing) may stand in at least partial tension, or that efforts to assess project outcomes may be ineffective or even distortionary. Accordingly, many projects do not acknowledge such tensions, at least in their proposals and external messaging. It is an open question whether more explicit address of these and other tensions within economic development projects might permit more effective planning for and navigation of such tensions. Any mandate to report risks, for example, may merely incentivize specification of minor and easily-managed downsides, bringing the appearance but not the substance of balanced consideration of potential project outcomes.

None of these tensions constitutes a critique of Georgia AIM. Rather, they seem to constitute fundamental conditions under which economic development programs must operate, particularly when also concerned with promoting equity. The discussion here aims to identify questions of strategic prioritization with which Georgia AIM is grappling in its everyday activities. That Georgia AIM personnel were able to articulate and speak to these tensions bodes well for the project's ability to navigate them. There is every reason to think that Georgia AIM is taking equity seriously and acting to promote it.

Several attendees suggested that Georgia AIM should serve as a model for future economic development programs, in Georgia and elsewhere. Georgia AIM certainly constitutes a great opportunity for learning, if the experiences, errors, successes, and lessons of the project can be captured and transmitted. Some of the most generally applicable lessons will come from how Georgia AIM navigates the four tensions discussed in this section. These seem to be inescapable in technology-oriented economic development, and, in a more general sense, in all collective or widely impactful action.

The fall 2023 Georgia AIM equity workshop offered a unique opportunity for leadership and personnel across the Georgia AIM project to reflect on and discuss the project's equity goals and operations, and to raise options for clarification and improvement of project goals and operations. The workshop identified many options for clarification of Georgia AIM's goals, evasion of potential pitfalls, and potential improvements to Georgia AIM's operations. We also note that many attendees spoke positively about the communication opportunity afforded by the workshop and called for continuation of such discussion in the future. We suggest that Georgia AIM should continue to convene dialogues, both across its subprojects and with its broader constituencies, about its equity operations and about other goals (e.g., support for small firms, promotion of good jobs).

## **Acknowledgements**

We are grateful to our 48 anonymous participants, who spent two hours in thoughtful and candid discussion with us about their work; to Georgia AIM's leadership team, who helped us to define the scope of the workshop reported here and to lead the workshop; and to Sue Bae, Jung Won Choi, Quintin Kreth, and Jeongyoon "Jane" Yang, our volunteer notetakers. This work was supported by the U.S. Department of Commerce Economic Development Administration under

Grant #04-79-07808. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Economic Development Administration.



## Appendix: Georgia AIM Project Components

Georgia AIM consists of 17 subprojects hosted at educational institutions and nonprofits across Georgia. We excerpt the following project breakdown from a personal communication with project leadership, with personal names removed. Leadership and personnel from all subprojects were represented at the fall 2023 equity workshop.

### 1. *Project 1 - Community Engagement*

- a. *Subproject 1: Rural Supply Chain Engagement* (Equitable deployment) – The Supply Chain and Logistics Institute (SCLI) is part of the H. Milton Stewart School of Industrial and Systems Engineering, the highest-ranked program in the country. This SCLI project bolsters rural supply chains through upskilling and credentialing employees in AI logistics and providing advisement and support for the adoption of AI logistics innovation in manufacturing firms and transportation networks, such as inland and seaports.
- b. *Subproject 2: K-12 InVenture Equity Immersion* (Equitable development) – The Georgia Tech K-12 InVenture Prize works to create the next generation of engineers and entrepreneurs by making invention education accessible to all students and teachers in Georgia. The GoSTEM program is paving a path toward higher education in STEM for K-12 Latinx and ESL students in Georgia. Together, they will provide diverse and inclusive engagement of youth through an inventiveness and entrepreneurship lens leading to immersive AI manufacturing education.
- c. *Subproject 3: Equitable Commercialization Center* (Equitable development and deployment) VentureLab faculty/student accelerator and its NSF, I-Corps South Node will create the Center for AI Commercialization, which will offer local and regional training and support for entrepreneurs creating startups based on the use of AI in manufacturing.
- d. *Subproject 4: Rural Small/Medium Manufacturer Engagement* (Equitable deployment) – GaMEP will work with small and medium enterprises to aid and encourage technology adoption and promote the benefits of implementing sensor technology and AI in their manufacturing processes. Additionally, the GaMEP will educate firms and individuals on cybersecurity to increase the adoption of best practices to ward off potential threats. Finally, it will work with the other projects to promote their efforts and market these services to rural manufacturing clients across the state, as applicable.
- e. *Subproject 5: Underserved Small/Medium Firm Engagement* (Equitable deployment) – The Enterprise Innovation Institute’s Diversity Engagement program advances the inclusion of underserved/underrepresented populations and communities in all the Institute’s efforts with external clients. It will manage the “Connect to Hire” program, which will focus on: (1) engaging manufacturers and other companies connected to the AI-related supply chain that are owned and operated by minorities, women, and veterans in the GA-AIM initiative; and (2)

connecting the workforce of these companies (especially those that do not have a college education) to the upskilling education/training programs under GA-AIM.

- f. *Subproject 6: Underserved Startup and Entrepreneurship Engagement* (Equitable development and deployment) –ATDC will create a vertical program for AI manufacturing startups with an emphasis on diverse founders and those in underserved parts of the state. This program will build upon the success of the Southeast Minority Business Development Agency (MBDA) Business Growth Hub for Black, Indigenous, People of Color (BIPOC) founders. It will also provide dedicated staffing and support for startups in the AI Manufacturing space—specifically helping with coaching, connections for funding, and identification of resources focused on AI manufacturing, such as the GA-AIM proof-of-concept center.
- g. *Subproject 7: Underserved Community of Practice for Economic Development Districts* (Equitable development and deployment) – The Center for Economic Development Research (CEDR) will support GA- AIM by: (1) providing economic development planning and research to regional communities; (2) convening rural economic development districts and regional partners in peer learning communities of practice (CoP) to share best practices and progress; and (3) helping communities develop AI manufacturing pilot programs or other relevant opportunities and connecting those opportunities back to GA-AIM coalition members.
- h. *Subproject 8: Lab to Underserved Community Program* (Equitable deployment) – Through the Georgia Smart Communities Challenge, the Partnership for Inclusive Innovation (PIN) will support community readiness for AI manufacturing.
- i. *Subproject 9: GA-AIM Project Governance* – Georgia Tech project management and financial professionals will track the progress and deliverables of the eight GA-AIM projects for EDA. One additional effort will measure the societal/ethical implications of innovations during translation to market.

## **2. Project 2 - Technical Workforce Development**

- a. *Technical College System of Georgia* - Training from technical colleges in AI manufacturing technologies will establish a workforce pipeline to support the growth of well-paying jobs enabled by GA-AIM. To ensure equity of access to GA-AIM opportunities in underserved communities, AI manufacturing studios will launch at four technical colleges that serve such communities. Georgia Piedmont Technical College will launch an AI semiconductor manufacturing studio to serve job growth in a nascent GA industry that is vital to national security and economic resilience. Two remote plant operations studios will launch, one each at Lanier Technical College and Southern Regional Technical College, to support of GA’s poultry manufacturers to further automate poultry processing, which increases their resilience and environmental safety and provides alternative pathways for workers who do not want to work in the processing environment. The final studio will be housed at Central Georgia Technical College, near Warner Robins Air Force Base (Robins AFB), to train

transitioning service members, veterans, and civilians in AI-enhanced robotic manufacturing. Additionally, the GA-AIM TWD project will create innovation incubators at four rural colleges (Columbus, Lanier, Southern Regional, and Wiregrass Georgia) to enact synergy around AI manufacturing innovation and entrepreneurship from kindergarten through college. TCSG will also develop data-driven frameworks, incorporating industry input, to predict workforce needs and to ensure equity in access and outcomes in TCSG's AI manufacturing programs.

- b. *Spelman College* – Training students on AR/VR coding.
3. ***Project 3 - Underserved Entrepreneurship Activation*** – In collaboration with KITTLABS and Technologists of Color, Russell Innovation Center for Entrepreneurs (RICE) and UGA will develop and deploy the LaunchPad AI Innovation Mobile Studio. This project will expose new audiences—particularly in rural and Black communities—to AI in manufacturing, allowing them to explore ideas, careers, and entrepreneurship in a growing, high-demand sector. Additionally, the AI Mobile Studio will create data that users can access to learn and test new concepts beyond the studio through UGA's digital twin studio.
4. ***Project 4 - Manufacturer Cyber Security Adoption*** – To ensure equity in protection and drive cyber resiliency as AI is implemented across the many manufacturing sectors addressed by GA-AIM, the Georgia Cyber Center (GCC) at Augusta University will develop and deploy a cyber risk assessment and assistance program to manufacturers through GA-AIM Project 4: Manufacturer Cyber Security Adoption (MCSA). This program will create awareness of cyber threats, develop an actionable strategy specific to a manufacturer's vulnerabilities, and recommend comprehensive, phased plans to mitigate associated risks.
5. ***Project 5 - Manufacturer Engagement*** will be led by the Technology Association of Georgia–Education (TAG-Ed) collaborative - TAG-Ed will guide corporations as they develop the necessary tech talent to help them in their adoption of AI manufacturing techniques. In addition to education and immersion activities, TAG-Ed will offer firms access to talent assessment and placement efforts to direct trained talent to open positions.
6. ***Project 6 - Middle GA Innovation Project*** – This project will deploy AI manufacturing mobile learning programs throughout rural counties, ultimately retaining local talent and growing these populations through the creation of high-paying jobs. Key regional industries will be engaged and connected with the talent pipeline through 1) Industry 4.0 and AI Robotics technology adoption programs; 2) Precision Agriculture innovation; 3) AI manufacturing start-ups; and 4) scholarship programs.
7. ***Project 7 - Southwest Georgia Ecosystem Building*** will be implemented by the 14-county Southwest Georgia Regional Commission (SWGRC). SWGRC will leverage existing strengths in agricultural and manufacturing sectors to increase AI manufacturing adoption in SW GA. By combining emerging technologies and building the regional workforce development foundation, Southwest Georgia will focus on key industries in

the region: 1) manufacturing in food production; 2) manufacturing start-ups; 3) supply chain logistics; and 4) workforce development.

8. ***Project 8 - AI Manufacturing Pilot Facility (AI-MPF)*** – AI-MPF will provide GA-AIM with a world-leading proving grounds for cooperative industry-academia-government pilot trials and innovation of new technologies, cybersecurity games, and workforce training to innovate, transition, and create AI manufacturing technologies and workforce with mitigated risk. Furthermore, AI-MPF will be guided by an ethics (equity, fairness, accountability, and transparency) work stream to prioritize opportunity and inclusion of underrepresented populations while assessing and improving societal impacts of AI manufacturing by supporting a well-trained and augmented workforce using state-of-the-art AI.