

Barriers and Drivers to Accessing and Using Workforce and Technical Assistance Resources for Small and Medium Manufacturers (SMMs) in Rural Regions

Economic Development Quarterly
2019, Vol. 33(1) 51–60
© The Author(s) 2018
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0891242418816380
journals.sagepub.com/home/edq



Sarah Lyon-Hill¹, Margaret Cowell¹, Scott Tate¹, and Albert Alwang¹

Abstract

Workforce shortages and market shifts have left many small and medium manufacturers (SMMs) struggling to maintain their operations. Still some SMMs tend not to utilize the workforce development and technical assistance resources available to them. This is particularly true of those in more rural regions where manufacturing is even more essential to the sustained vitality of these economies. This study explores the factors preventing these firms from pursuing and accessing these services. The authors used surveys and interviews to engage manufacturers with fewer than 500 employees in rural Southwestern Virginia and identify factors limiting their participation in these services. Findings indicate constant and consistent outreach to SMMs, regular engagement in social and economic networks, and a diverse array of services tailored to rural SMMs' needs to play key roles in developing productive partnerships between SMMs and resource providers.

Keywords

rural, manufacturing, workforce, technical assistance, resources

The postrecession economic growth in America has been predominantly urban and many rural places are continuing to experience slow growth or decline. Manufacturing remains a key industry in rural areas and manufacturing companies may often be the largest private employer and an important economic cornerstone in a rural county. The question of how to strengthen American manufacturing has received much attention recently. The challenge is particularly acute for small and medium manufacturers (SMMs) in rural areas. While many larger U.S. manufacturers have continued to grow revenues, those same numbers have lagged for SMMs, who often necessitate strategic guidance to understand market opportunities (Pinkus, George, & Ramaswamy, 2017).

Retaining rural manufacturing establishments and helping those companies grow and thrive in rural areas is a concern for national, state, and local policy makers. Direct assistance to existing companies is provided through a web of services and resources accessed through federal, state, regional, and local providers. Indeed, many resource providers have expanded their activities to strengthen regional manufacturing. State agencies, manufacturing extension partnership entities, workforce organizations, community colleges, and other institutions attempt to retain rural manufacturing establishments by providing technical assistance (TA) and workforce development (WD) programs that otherwise do not exist or are not within reach for most SMMs.

Some of these organizations have also secured new funding or new offerings to support manufacturing companies and their workers. Despite this push, SMMs, particularly those in more rural regions, frequently fail to pursue or access the very resources that might assist with talent and skill shortages or with diversification of products or markets.

The authors have experienced this phenomenon firsthand in their work with companies, workforce organizations, and other resource providers as part of regional economic restructuring efforts in rural Southwestern Virginia, which includes several Appalachian coal-reliant communities. Despite an increase in federal and state funding through federal Rapid Response, Partnerships for Opportunity and Workforce and Economic Revitalization (POWER), and other initiatives—which support incumbent worker training, preapprenticeships, and market diversification—many of the SMMs the authors encounter either decline to participate or are unaware of these offerings. Workforce entities and the regional manufacturing industry association in Southwest Virginia received

¹Virginia Tech, Blacksburg, VA, USA

Corresponding Author:

Scott Tate, Office of Economic Development (0373), Outreach and International Affairs, Virginia Tech, 702 University City Boulevard, Blacksburg, VA 24061, USA
Email: atate1@vt.edu

nearly \$6 million in federal funding in the past 2 years from the Appalachian Regional Commission and U.S. Department of Labor, much of that for new training and assistance initiatives. The state manufacturing partnership received \$1.7 million in new federal funding to support Virginia SMMs to develop new products and customers, expand into global markets, adopt new technology, and support domestic production efforts. There has been a marked increase in direct outreach to manufacturers in the region, particularly by the state's manufacturing partnership, the Southwest Virginia Alliance for Manufacturing, community colleges, and workforce boards. In this region—and likely in many other rural regions—low participation represents a significant challenge, especially given that many of these companies appear to need assistance due to recent economic downturns, reported worker and skill shortages, or regional supply chain challenges. The challenge becomes particularly acute when one considers the crucial economic and social roles that SMMs play in these rural areas, not only as employers but also as significant sources of higher-than-median-wage jobs, and contributors to community-giving campaigns.

The factors influencing SMMs' use of resources and participation in assistance programs and networks have not been widely studied, particularly in economic development circles. Past studies have confirmed that the participation and engagement of SMMs with partner organizations and resources is "disappointingly low" (Freel, 2000). Several studies allude to this challenge and suggest the need for additional research (Briscoe, Fawcett, & Todd, 2005; Estrin, Foreman, & Garcia-Miller, 2003; Freel, 2000; Laforet & Tann, 2006; Millward & Lewis, 2005).

This study seeks to identify and better understand why more SMMs in Southwestern Virginia are not using WD and TA resources. It further asks whether underutilization is the result of quality or content of the assistance of training, access barriers, company-specific challenges, or other factors. WD services tend to include worker-focused career assistance, job training, and skill development. TA generally includes a broader array of company-focused services such as business assessments, process improvement, and market and export assistance. In Southwest Virginia, workforce providers have enhanced their offerings and are increasingly focused on employer engagement and sector-specific strategies. The workforce boards and community colleges have successfully secured new and increased funds for worker training, particularly for dislocated workers from manufacturing and coal. GenEdge, Virginia's manufacturing assistance program, and the Southwest Virginia Alliance for Manufacturing also have new resources for TA. However, the staff of these entities remain modest and most staff are charged with covering a wide geographic region, ranging from north of Roanoke to the Cumberland Gap, in some instances.

The study begins with an overview of existing literature, which alludes to possible explanations for SMM participation

or a lack thereof in WD and TA resources activities. Notably, these studies do not yet address the current, postrecession rural context. The study then describes a mixed-methods approach to exploring these opportunities and challenges, offering key insights into SMM-resource-provider engagement from interviews with rural SMM firms. It concludes with a discussion on possible implications of these findings.

Context and Review of Existing Literature

Research on SMMs generally examines their ability to adopt technology, sources of knowledge, and the characteristics that lead to innovation. These broad research categories do not directly allude to firms' access to WD and TA programs; however, external information sources and engagement are often mentioned as either barriers or drivers to innovation. Challenges vary slightly across WD and TA programs, which offer different types of products and services. Firms' characteristics also determine the capabilities and capacities to pursue these different types of programs. Rural SMMs face particular challenges to innovation not only because of their size but also because of their rural location.

Size speaks to organizational limitations and is associated with limited financial, personnel, and knowledge resource capacity. SMMs possess limited financial resources, which can inhibit the ability to purchase, develop, and adopt new technology (Ariss, Raghunathan, & Kunnathar, 2000; Bigliardi, Colacino, & Dormio, 2011; Freel, 2000; Harland, Caldwell, Powell, & Zheng, 2007). SMMs are also less able to pay for the training associated with the new processes or technology and sometimes struggle to hire and retain skilled laborers (Theodore & Weber, 2001). Even SMMs with the necessary financial resources still may not be able to invest the time, space, and other resources required to develop new technology, streamline manufacturing processes, or train workers because those investments could delay day-to-day operations necessary for the firm to survive (Briscoe et al., 2005; Done, Voss, & Rytter, 2011). Done et al. (2011) note that SMMs rarely possess the capacities required for long-term innovation, including things like cultural shifts within factories that require institutional changes at all levels (i.e., management, shift workers, and human resources). Workforce development and TA programs have the opportunity to address many of these resource challenges.

A rural location imposes additional challenges that SMMs must navigate to be successful, including a lack of peer supports, fewer resource providers, and greater distance to final markets, among other impediments. The stakes are high for rural SMMs, as they tend to comprise a larger part of the local economy in terms of jobs and gross regional product and are thus more influential in the economy's success (Economic Research Service, 2017). As such, the potential failure of these firms poses even more of a threat to rural areas when compared with their urban counterparts.

SMMs—whether urban or rural-based—tend to be relatively insular, mainly due to the limited number of resources available in their networks and because of their reliance on only a few customers (Lefebvre, De Steur, & Gellynck, 2015; Malecki & Poehling, 1999; Rothwell, 1991). Briscoe et al. (2005) found that SMMs tend to change their practices only when given input from their customers or when mandated by government regulations and are less influenced by external networks or best-practice models. While many firms remain competitive because of their reliance on customer input, this same reliance also illustrates that SMMs are reactive and tend not to access alternative information sources like so many innovative firms do. The insular nature of SMMs can be heavily influenced by existing company leadership (Estrin et al., 2003; Malecki & Poehling, 1999). Innovative firms, on the other hand, tend to have management that is open to external experts as information sources (Achanga, Shehab, Rajkumar, & Nelder, 2006).

Other than direct business networks (suppliers and customers) and partnerships with similar regional manufacturers, SMMs may be less likely to participate in networks that involve government entities (including higher education institutions). Higher education collaboration can be an indicator of innovation among SMMs (Freel, 2000); however, these institutions are often perceived as “ivory towers,” and collaboration is impeded by the differences in paces of research compared with business decisions and potential intellectual property disputes. Access to additional external networks (including government, nonprofit, higher education, manufacturing association, etc.) can be a common characteristic in innovative SMMs. These collaborations increase firms’ technical capacity, reduce costs associated with accessing new information and marketing, and tend to increase SMMs’ acceptance of seeking outside expertise (Freel, 2003). Reidolf (2016) found that proactive networks—those that involved multidirectional collaboration rather than simple transfer of knowledge—led to higher levels of innovation among rural SMMs. These networks included special customers, scientific organizations, and nonhuman actors (e.g., trade shows). Reidolf (2016) concluded that rural SMMs were able to overcome isolation by establishing partnerships with international actors (exporting business partners).

Establishing networks among rural manufacturers has long been considered an important approach to strengthening the competitiveness of rural SMMs (Sommers, 1998). Sommers (1998) found that three regional network experiments had a “modest” impact on business performance. The study concludes that, when developing networks, policy makers need to account for size and capacity of firms, stage of development of respective firms (funding for start-up vs. capital for more established firms), and soft versus hard networks. Soft networks comprise capacity-building institutions, often economic development agencies, while hard

networks include similar businesses attempting to develop new products or enter new markets (Sommers, 1998). The key to success in these types of networks is employer participation, as employers are less likely to participate in programs with government agencies (Green & Galetto, 2005). Moreover, rural areas provide an additional hurdle in network formation as distance impedes communication and therefore trust across manufacturers (Green & Galetto, 2005). Nonfarm tradable industry establishments in rural areas are also less likely than their urban counterparts to be innovative (Wojan & Parker, 2017).

Much of the cited literature alludes to reasons why rural SMMs may or may not engage WD and TA resources; however, this literature tends to focus on either rural manufacturing as a whole or SMMs in general. There is a gap in more recent literature examining domestic rural SMMs’ access to WD and TA programs, particularly considering ramifications of the Great Recession on rural regions. Probably the most notable study examining this topic was the USDA Economic Research Service’s Rural Manufacturing Survey, which was conducted in 1996. In terms of government assistance, the survey found that a high number (60%) of rural firms relied on assistance programs, including tax incentives, loans, and grant programming (Greenberg & Reeder, 1998). Greenberg and Reeder (1998) showed that larger rural manufacturers tend to use government assistance programs (primarily tax incentives) at a higher rate than small rural manufacturers (the only exception is for loans administered through the Small Business Administration). Additionally, the survey revealed that rural firms using advanced technologies reported higher uses of government assistance programs than those who did not use advanced technologies.

Overall, the existing literature reveals that there is much to be learned about SMMs in general and especially those that operate in more rural areas. Given the mounting pressures observed in these geographies and the constrained resources in many local and state agencies, we observe a need to learn more about how and if these firms find out about and utilize TA and WD services. While this study does not address whether TA and WD services are effective in rural areas, the results do begin to address the question of whether and how SMMs utilize these services in one region of the United States. To shed light on these and other challenges, the authors conducted a mixed-methods study in which they engaged SMM firms in Southwest Virginia.

Method and Approach

For this study, we define WD as any funding and services (training, classes, certification, internships, degrees, and apprenticeships) specifically tailored for manufacturing employment provided by regional WD boards, community and technical colleges, local nonprofits, and even local K-12 schools. Technical assistance (TA) is defined as any external

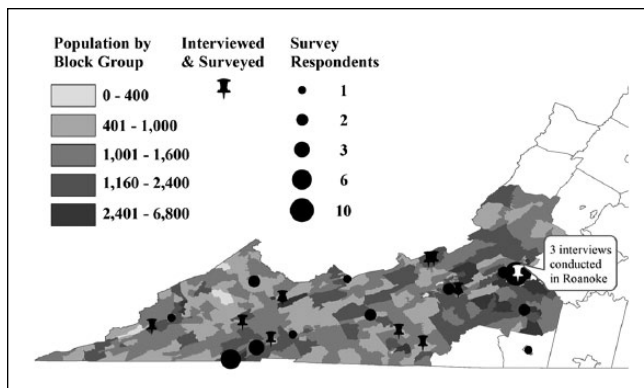


Figure 1. Small and medium manufacturers survey respondents tend to be in more populous areas.
Source. U.S. Census (2010).

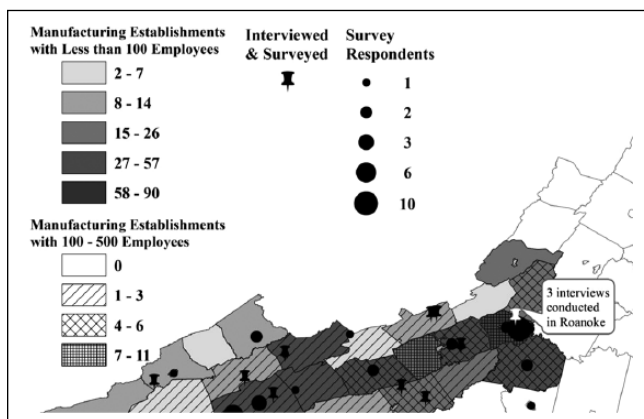


Figure 2. The location of survey and interview respondents seems proportional to the relative density of the manufacturers in the region.
Source. U.S. Census (2015).

assistance provided to the manufacturer for operation improvements, including lean manufacturing practices, establishing production benchmarks, improving energy efficiency, identifying new markets, export assistance programming, and more.

This study employed a mixed-methods approach and uses the U.S. Small Business Administration (2017) size standards as a reference for classifying manufacturers. SMMs are therefore considered those with fewer than 500 employees, as indicated by the most conservative Small Business Administration definition (U.S. Small Business Administration, 2017). As illustrated in Figures 1 and 2, both surveys and interviews spanned the Southwest Virginia study region and were relatively proportional to the population and manufacturing density of that region. The region includes 29 jurisdictions, mostly rural, which include all of Virginia's coal-producing counties and all but five of the state's Appalachian Regional Commission counties.

The survey asked for basic information about the company, including product(s) and size, an assessment of the company's workforce retention rates and worker needs including skills and credentials, input on whether the company uses external resource providers, and its familiarity with regional resources that may help address workforce and technical needs. The survey was distributed as part of a U.S. Department of Labor-funded project, partly focused on enhancing the region's manufacturing sector and strengthening connections between workforce partners and employers. The study team mailed surveys to 219 SMMs located in Southwest Virginia. The SMMs were selected from a larger list of close to 700 employers. From that list, the study team selected companies with 50 or more employees. The list was reviewed a second time, and additional companies (with over 25 employees) were added, in some instances in which localities had fewer overall establishments of 50 or more workers. The completed surveys totaled 46, a response rate of 21%. Although the low response rate is low, existing research suggests that because surveys of organizations typically generate fewer responses than surveys of individuals, a return rate above 15% is acceptable in some organizational surveys (Hager, Wilson, Pollak, & Rooney, 2003).¹

Because the survey response rate was less than ideal, the researchers augmented survey findings with semistructured interviews with the survey respondents who expressed interest and voluntarily provided contact information. Of the 40 SMMs that provided contact information, researchers were able to schedule and conduct interviews with 13 individuals. The interviews lasted between 30 and 60 minutes and followed a standard protocol intended to elicit open-ended responses. Researchers explored respondents' understandings and awareness of WD and TA resources, differentiating between both. Unless examples were requested by the respondents, there was no definition of either type of programming to ensure inclusion of all resources available. Researchers asked whether and what kinds of resources and resource providers SMMs have used, probing for reasons as to why they have or have not utilized these resources. Finally, researchers asked about services that SMM respondents would like to see in the future and how these resource providers might best engage these companies. Interviews were conducted by telephone. Interviewers recorded detailed notes, during and immediately after the interviews, and notes were subsequently summarized in memo format for comparison across cases. In addition to the memos, researchers also used focused coding to identify and combine initial data into larger categories that subsumed multiple codes (Bailey, 2007). The combination of memoing and axial coding allows the researcher to elaborate on concepts and themes identified in the narrative data, which then are used to construct theoretical arguments or emergent theory (Holton, 2007).

The mixed-methods approach allowed the team to use multiple data points to delve deeper into the circumstances

Table 1. Composition of the Regional Manufacturing Industries and the Survey Sample.

Three digit NAICS code	Manufacturing subsector	Region, %	Survey, %
311	Food	13.3	4.4
312	Beverage and Tobacco Product	4.6	0.0
313	Textile Mills	0.8	4.4
314	Textile Mills Product	1.8	4.4
315	Apparel	0.7	0.0
316	Leather and Allied Product	0.3	0.0
321	Wood Product	5.2	0.0
322	Paper	0.8	0.0
323	Printing and Related Support Activity	14.4	8.9
324	Petroleum and Coal Products	1.4	2.2
325	Chemical Manufacturing	2.7	0.0
326	Plastics and Rubber Products	2.7	0.0
327	Nonmetallic Mineral Product	4.2	4.4
331	Primary Metal	2.5	0.0
332	Fabricated Metal Product	10.6	11.1
333	Machinery	7.6	8.9
334	Computer and Electronic Product	2.7	2.2
335	Electrical Equipment, Appliance, and Component	2.4	8.9
336	Transportation Equipment	2.9	8.9
337	Furniture and Related Product	2.2	8.9
339	Miscellaneous	16.1	22.2

Note. NAICS = North American Industry Classification System.
Source. Emsi (2018).

of SMMs in one rural region and to interrogate the disconnect between SMMs and service providers. The research aim is to build on existing field studies and construct a stronger, evidence-based framework for understanding drivers and reducing barriers to participation in assistance programs and services for SMMs.

Findings

The authors began by reviewing summary statistics between the survey sample and the regional population of manufacturers. Manufacturers in the study, on average, reported employing roughly 121 individuals. This is higher than the regional average of 40; however, the study intentionally attempted to survey and interview manufacturers reporting between 25 and 500 employees. Roughly 22% of the manufacturing survey sample have fewer than 25 employees, while 67% of the regional manufacturers employ less than 25 employees (Emsi, 2018). Table 1 highlights the different manufacturing industries in the region (population) and the survey sample. The top three manufacturers in terms of the

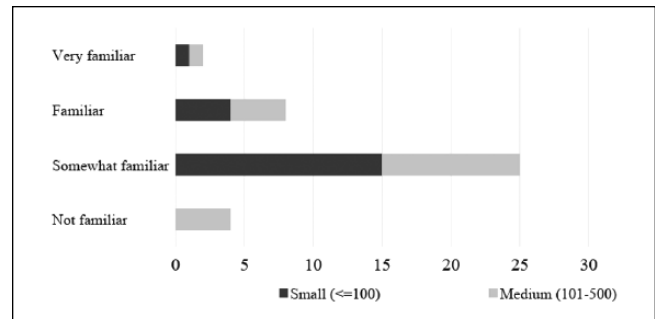


Figure 3. Survey respondents' awareness of workforce development, training, and technical resources in the state/region, by size of business.

number of establishments for the region are Miscellaneous, Printing and Related Support Activity, and Food manufacturers. This is similar for the survey sample, with both Miscellaneous, and Printing and Related Support Activity in the top three, along with Fabricated Metal Product. Both the sample and regional population represent a diverse composition of manufacturing industries.

Next, follows a brief discussion of the results of the survey, which focused mainly on awareness and utilization of regional WD offerings. There were 45 total valid survey respondents having 500 or fewer full-time employees. Of those, 26 (57.7%) had 100 or fewer employees. Overall, only 22% of all survey respondents considered themselves familiar or very familiar with WD, training, and technical resources in the state/region and particular programs from which their company might benefit (see Figure 3). Unsurprisingly, only seven respondents (15.5%) indicated that they regularly work with external providers for employee training. The need to connect service providers and employers is further demonstrated by the two thirds of respondents who also indicated that their company often fills jobs with candidates who require a significant amount of additional training. Similarly, nearly half (46.6%) of all respondents indicated at the time of the survey that they had unfilled positions at their company due to a lack of candidates with the required skills and qualifications. Overall, the survey revealed a population of small and medium businesses that are generally unfamiliar with, and do not avail themselves of, the WD resources available to them. For more insights into why this disconnect exists, we turn to the interview data below.

The interview data confirmed many of the same challenges, although substantial variation was observed in terms of the reasons why respondents were not typically accessing WD resources. The barriers to accessing TA services, on the other hand, were more uniform across the interviewees. In thinking about future offerings and ways to improve the relationship between SMMs and TA/WD service providers, interviewees had numerous and varied suggestions, many of which are discussed below. Many respondents also provided

anecdotal evidence of innovative ideas and early-stage efforts that should provide optimism that the relationship between SMMs and service providers in rural areas can be improved.

Indeed, 7 out of 13 interviewees were aware of WD resources in the region. Of the seven SMMs who were aware of available resources, only five stated that they had utilized these resources. These findings suggest a problem that is twofold: first, a fairly widespread lack of awareness about WD resources that are available in the region and second, an underutilization of said resources. Both problems are in line with existing research, which finds that smaller firms tend to underinvest (both in terms of time and money) in TA and other forms of external assistance because they lack knowledge about what is available, and it is sometimes not possible for them to receive the full benefits of such investments (National Academies, 2013). While the researchers provided suggestions for ways to improve awareness regarding available resources below, the researcher's interview data suggest that there is much to do here. Because most SMMs in this study appear largely unaware of the resources that are available, it is impossible to know whether they would access said resources if they were to know about them. Hence, the study now turns to a discussion of other reasons why SMMs are not accessing these WD resources.

A common refrain among interviewees was the notion that the SMMs themselves were "too specialized" or "too isolated" to benefit from WD resources that are or would be available within their rural region. The majority of SMMs interviewed—even those who were presently utilizing or had accessed WD resources in the past—believed their WD needs would be too narrow to be of interest to other SMMs in the region. Interviewees frequently noted that they were either "the only game in town" or the only firm utilizing a particular skill set or equipment type in the larger region. In these instances, interviewees were less sanguine about the usefulness of potential and existing WD resources. Related challenges stem from the isolation that many of these SMMs feel in their largely rural areas. Most truly felt like their smaller size and lack of proximity to others doing similar work would make it more difficult for resource providers to offer them services that would be both specific enough to meet their needs and close enough in terms of geographic proximity.

One other unique finding that only applies to a few of the interviewees, but is nevertheless important to note, is the set of challenges that branch plants in these rural areas face when it comes to accessing WD resources. Most of these branch plants do not have autonomy when it comes to things like accessing local resources. It is not surprising then that some interviewees expressed frustration about the tension between the need to hire from the local workforce, especially for lower and midlevel positions, and the centralized nature of most of their operations. In other words, WD programs

that would prepare local workers to enter the branch plant's workforce would be welcomed, but branch managers are hamstrung a bit by the centralized nature of most decision making pertaining to the firm. Related difficulties in branch plant establishments has been documented in a recent study of manufacturing plant survival (Low & Brown, 2016).

When it comes to TA resources, the interviewee responses were more uniform. Only two interviewees had accessed TA resources in the past and the remainder had no experience nor understanding of what TA includes. Across all 13 interviews, the interviewers were asked to give examples of what TA might include and specific examples of available resources within the region before the SMMs were able to answer the question about whether they had utilized TA resources in the past.² The findings related to TA resources were therefore twofold. First, the term "TA" did not resonate with the SMMs that were interviewed. Second, when provided with examples of TA resources, only two recalled accessing TA resources in the past. There appears to be an alarming disconnect between SMMs and TA resource providers in this region. SMMs are not only unclear on what TA is and how it could help them but they are also not accessing the resources that are presently available.

In truth, compared with the WD resources in this area, TA providers are much fewer and far between; however, even those who have utilized these services note challenges. At least one interviewee who had previously worked with TA providers reported that the process itself was a barrier; both a manufacturing extension partnership resource and a university-related assistance resource were deemed "too slow" to be able to respond to their specific company needs and opportunities in a timely and useful manner.

Despite the general lack of awareness and underutilization of available WD and TA resources, interviewees were optimistic about their willingness and ability to avail themselves of these resources in the future. When asked about what could be done to improve their utilization of these resources in the future, most interviewees mentioned the need for timely and relevant information about what is available. They were, however, split in terms of how they would like to see future communication occur. Many of the larger SMMs expressed interest in web-based resources, including one-stop web pages with available resources, opportunities, and contact information. Many of the smaller or owner-operated SMMs mentioned the need for in-person meetings or individualized phone calls, either with field agents or with their peers. Suggested offerings included monthly roundtables or targeted sessions that would allow them to acquire new knowledge and network at the same time. Multiple interviewees mentioned recent sessions focused on upcoming health care changes that were particularly useful and could serve as a model for related offerings in the future. Over 84% of SMMs surveyed expressed a willingness to attend and participate in manufacturing sector employer meetings. It is important to

note that those same SMMs that expressed a desire to see in-person offerings were often the same SMMs that lamented the difficulty in being able to leave their workplace long enough to travel to and attend these types of offerings. It would be wise therefore to consider flexible offerings, perhaps with rotating meeting places, blended classrooms, or virtual offerings.

Finally, one bright spot in the interview data pertains to the innovative ideas and emerging resources that some interviewees described. Some interviewees mentioned innovative ways that they were collaborating (or planning to collaborate) with other regional institutions to provide, and in many cases design, their own WD and TA offerings. Most of the intersections were with educational institutions, namely to utilize computer facilities or partner with technical high schools to design programs that match SMM needs. Some interviewees mentioned interactions with area universities and colleges, but most found the academic timeline to be too sluggish or cumbersome to suit the needs of the modern SMM. Overall, interviewees generally expressed a strong desire to leverage what already exists within the region.

Discussion

The combined survey and interview data support the hypothesis that many SMMs in rural areas do not access WD and TA offerings with much frequency. The findings from this research touch on many key factors that limit SMM access and use of WD and TA services in more rural regions. In addition to a distinct lack of resource awareness, interviewed firms tended to agree on four reasons for why they do not access resources: (a) they feel their needs are too specialized, (b) they sense that they are too isolated, (c) the services are deemed “too slow,” or (d) they are branch operations that have little decision-making responsibilities. Here, we highlight three key implications of these findings: (a) the need for constant and consistent communication with SMMs concerning the resources available to them, (b) the importance of formal and informal networks in improving awareness and accessing WD and TA services, and (c) specific differences among SMMs that service providers and policy makers should account for when attempting to address manufacturing needs.

Outreach and Communication to SMMs

Limited awareness and understanding of WD and TA services is an evident barrier to SMMs accessing these resources. Ironically, the same internal resource limitations for which resource providers wish to compensate are among the same reasons that these firms may know very little about the support services available to them. As the literature illustrates, SMMs tend to be very insular because they lack the personnel and other resources to reach out to external networks.

While SMMs may express interest in engaging in these services during surveys and interviews, their circumstances require that service providers continuously communicate their services and provide very flexible access for most SMMs to take advantage of these resources.

At the most basic level, SMM respondents seem to welcome more frequent dialogue and conversation. One interviewee, for example, explained that workforce and other service providers should continue to contact her by phone and events because, at some point, there would arise an opportune time when her firm would require their assistance. Another commented that their company had never been asked openly by providers as to what help they needed.

While one limitation of this research is that providers were not interviewed or surveyed, the researchers have engaged extensively with resource providers and SMMs in this region through projects in partnership with regional WD boards and economic developers. In group sessions and individual conversations throughout 2017, support and assistance organization members expressed a concern that manufacturers were being approached too often and by too many providers. The findings from SMMs seem to suggest this concern may be exaggerated, and that many SMMs welcome recurrent and repeated contacts through a variety of mechanisms. This ambiguity highlights the importance of continued conversation between all relevant stakeholders to ascertain and monitor over time what is feasible and desired from both the providers and consumers of TA and WD programs.

Indeed, SMMs may expect more immediate responsiveness and quicker levels of service from providers. This research indicates the need for WD and TA organizations to dedicate more of their own resources to reach out to manufacturers with questions about their needs and how these organizations might address those needs. However, providers may be understaffed or may have other interests or constraints, such as the semester timetable and student learning outcomes for project-focused student courses. To ameliorate these challenges, some of this outreach may be done in collaboration with other regional organizations. These collaborations could also serve as a means of better illustrating the multiple services available to SMMs and thus the value of engaging with the broader network of service providers.

Importance of Utilizing and Developing Networks

Networking within regions and among manufacturers is another clear method of raising awareness about these services. Drawing from social capital literature, we know that social and knowledge networks promote trust and connectivity within a community, and when leveraged, they foster greater economic development and job growth outcomes (Engbers, Rubin, & Aubuchon, 2017). Both hard and soft networks provide viable opportunities for manufacturing success: soft networks can be a successful model of transferring development services, and

hard networks provide a mechanism for firms to collaborate and innovate (Sommers, 1998). An example of a “soft” network includes WD networks, which have been utilized to deliver economic development services across organizations and regions (Green & Galetto, 2005).

In the interviews and the literature, however, researchers found that the more rural the community, the more difficult it is to access or develop these networks. One reason for this difficulty, other than lack of density, may be that the nature of these networks is different in more rural areas. For instance, Oberhauser, Pratt, and Turnage (2001) suggested that more rural economies, particularly those in Appalachia, rely on more informal kinship and community-based networks—networks not often tapped by more formal WD and TA organizations. Likewise, in a related study of entrepreneurial ecosystems, the authors of this study found that rural regions may thrive with the presence of a variety of interconnected and permeable informal networks where relationships can translate to tangible activities (Cowell, Lyon-Hill, & Tate, 2018). Another reason for SMMs’ and service providers’ inability to access or develop these networks is the economic upheaval that has occurred in many rural regions of the United States. Many manufacturers and industries that represented economic drivers of these regions left, essentially diminishing the existing social and economic networks that existed in these communities.

While WD and TA organizations should find ways of accessing informal networks where SMMs may engage and play roles in rebuilding networks, the organizations face two challenges. First, cultural tradition may encourage SMMs to maintain the status quo, which reinforces their insular nature. Second, as Green and Galetto (2005) noted, the most successful networks will be employer-led, even when service providers play a significant role in establishing or organizing the network originally. To overcome these challenges, service providers may want to engage more innovative SMMs because employer engagement in WD and TA services seems to be more prevalent among SMMs who use advanced technology or who have more forward-thinking leaders (Achanga et al., 2006; Freel, 2000; Reidolf, 2016). Involving these innovative firms as initial partners could be helpful to the service providers in establishing and rebuilding a strong network within rural regions. This suggests the possibility for more and different types of training and support for company management and supervisors, perhaps in the form of networking, mentoring, executive training, and coaching. However, early-stage screening and training of potential SMM partners will be important first steps for these interventions to be successful.

Adapting Services to the Needs of Different SMMs

Many of these barriers to awareness and access also hinge on resource providers’ understanding of SMMs. Through this research, the authors identified at least two different spectrums

on which different manufacturers fall. Adapting to the needs of these different SMMs may be essential to resource providers increasing their service provision to companies. First, some SMMs are more specialized than others. Indeed, one key finding of this research is that several SMMs thought their needs were too specialized for general WD and TA aid (e.g., trainings and workshops). A more specialized firm may be less interested in general workforce training or TA programming. Instead, they might require one-on-one TA tailored to their specific needs, such as identifying new markets or new product development. In this case, TA providers may need to signal their own flexibility in addressing SMM needs and identify ways of facilitating greater access to their services. One inherent challenge to this approach is the financial resources entailed in one-on-one assistance. SMMs often do not have these resources. Meanwhile, public funding used to support or subsidize service provision typically does not allow for programming that addresses the needs of so few businesses, the rationale being too little return on investment and public benefit in the short term. Considering the economic significance of SMMs in more rural regions, however, a policy shift may be necessary. More research on the economic impacts of individualized TA to rural SMMs may illustrate significant public benefit to these rural regions, thereby necessitating broader policy changes to structure and fund rural economic initiatives.

Second, there may be different needs and considerations for single establishment firms than for branch firms. As illustrated in the findings, branch firms may have significantly greater difficulty accessing the WD and TA services traditionally known to companies. For instance, workforce training for a single establishment firm is relatively simple compared with a branch firm that needs permission from its corporate headquarters in another state.³ The few branch firms interviewed expressed more interest in ways that WD providers could develop the interests of potential workers in manufacturing, helping build a workforce pipeline. Thus, while single establishment firms may still take advantage of traditional training opportunities, WD providers may expand on services that address larger regional challenges for a broader set of manufacturers. Activities and services could include increasing junior high and high school student interest in working in manufacturing, addressing soft skills gaps, or exploring collaborative solutions to other challenges that may inhibit workers from taking or staying in manufacturing jobs (e.g., health care, transportation, and child care provision).

Conclusion

This research demonstrates several key factors that inhibit SMMs when accessing WD and TA resources in more rural regions. To address this topic, the authors surveyed and interviewed manufacturers with less than 500 but typically more than 50 employees in rural Southwest Virginia. The authors

explored reasons why these firms accessed or did not access the WD and TA resources available to them in their region. While solutions were not the focus of this study, the findings do highlight the growing need to address the WD and TA concerns of SMMs in rural areas.

There were some limitations to this study in that not all companies were surveyed, the quality and effectiveness of available resources were not assessed, the respondents were not uniformly distributed across the area's localities, and the number of interviews were limited by study time and resource constraints. Responses confirmed much of the current research on SMMs: the majority of SMMs in rural regions do not utilize these resources. In fact, most respondents were unfamiliar with the WD and TA services available in the region.

Many respondents described their operations as "too specialized" or "too isolated" for these service providers to be of much help. They saw some of these services as "too slow" or, as branch firms, they did not have the flexibility to work with some of this programming. Despite these reservations, some respondents indicated a willingness to avail themselves of these resources if they knew about them. Others, who were perhaps more knowledgeable of these services, cited a few innovative collaborations they had developed, particularly with educational institutions. These partnerships allowed for greater access to state-of-the-art training and equipment for these SMMs. For such collaborations to grow and evolve in the future, service providers and policy makers may consider ways of ensuring (a) more constant and consistent contact through a variety of means between SMMs and service providers, (b) improved networking among these groups in more rural regions, and (c) a more diverse array of services that match the unique needs of different SMM types in rural regions. The findings also suggest opportunities for additional future research on such areas as the role of regional networks, the potential for targeted leadership development, and the need for more differentiated and repeated outreach and communication strategies.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The author(s) received no direct financial support for the research, authorship, and/or publication of this article, although manufacturer surveys were conducted as one part of a project conducted by Virginia Tech on behalf of the Virginia Community College System utilizing U.S. Department of Labor Rapid Response funding.

Notes

1. Organizational surveys, which are often delivered at workplaces (as is the case in this study), are returned at lower rates in part because of workplace needs, confidentiality concerns, and

prohibitive rules and policies (see also Greer, Chuchinprakarn, & Seshadri, 2000).

2. In cases where the interviewee did not comprehend the term "technical assistance" or what it could entail, the interviewer provided a definition and examples for the interviewee to consider.
3. There are, of course, varying degrees of autonomy in branch plants. However, as Massey (2008) notes, "Such 'managerial hierarchies' have become longer and more complex with the development of capitalist production" (p. 112). As such, decisions about the branch are often influenced more by the parent company than by the surrounding region.

References

- Achanga, P., Shehab, E., Rajkumar, R., & Nelder, G. (2006). Critical success factors for lean implementation within SMEs. *Journal of Manufacturing Technology Management*, 17, 460-471.
- Ariss, S. S., Raghunathan, T. S., & Kunnathar, A. (2000). Factors affecting the adoption of advanced manufacturing technology in small firms. *SAM Advanced Management Journal*, 65(2), 14-21.
- Bailey, C. (2007). *A guide to qualitative field research*. Thousand Oaks, CA: Sage.
- Bigliardi, B., Colacino, P., & Dormio, A. I. (2011). Innovative characteristics of small and medium enterprises. *Journal of Technology Management & Innovation*, 6(2), 84-92.
- Briscoe, J. A., Fawcett, S. E., & Todd, R. H. (2005). The implementation and impact of ISO 9000 among small manufacturing enterprises. *Journal of Small Business Management*, 43, 309-330.
- Cowell, M., Lyon-Hill, S., & Tate, S. (2018). It takes all kinds: Understanding diverse entrepreneurial ecosystems. *Journal of Enterprising Communities: People and Places in the Global Economy*, 12, 178-198.
- Done, A., Voss, C., & Rytter, N. G. (2011). Best practice interventions: Short-term impact and long-term outcomes. *Journal of Operations Management*, 29, 500-513.
- Economic Research Service. (2017). *Rural manufacturing at a glance, 2017 edition*. Retrieved from <https://www.ers.usda.gov/webdocs/publications/84758/eib-177.pdf?v=42962>
- Emsi. (2018). *Business table, businesses for manufacturing in 27 Virginia counties, Emsi Q4 2018 data set* [Data File]. Retrieved from <https://www.economicmodeling.com/>
- Engbers, T., Rubin, B. M., & Aubuchon, C. (2017). The currency of connections: An analysis of the urban economic impact of social capital. *Economic Development Quarterly*, 21, 37-49.
- Estrin, L., Foreman, J. T., & Garcia-Miller, S. (2003). *Overcoming barriers to technology adoption in small manufacturing enterprises (SMEs)* (Technical Report CMU/SEI-2003-TR-012). Pittsburgh, PA: Carnegie Mellon University, Software Engineering Institute.
- Freel, M. S. (2000). Barriers to product innovation in small manufacturing firms. *International Small Business Journal*, 18(2), 60-80.
- Freel, M. S. (2003). Sectoral patterns of small firm innovation, networking and proximity. *Research Policy*, 32, 751-779.
- Green, G. P., & Galetto, V. (2005). Employer participation in workforce development networks. *Economic Development Quarterly*, 19, 225-231.

- Greenberg, E., & Reeder, R. J. (1998). *Who benefits from business assistance programs? Results of the ERS rural manufacturing survey*. Retrieved from <https://ageconsearch.umn.edu/bitstream/33727/1/ai987364.pdf>
- Greer, T. V., Chuchinprakarn, R., & Seshadri, S. (2000). Likelihood of participating in mail survey research: Business respondents' perspectives. *Industrial Marketing Management*, 29, 97-109.
- Hager, M. A., Wilson, S., Pollak, T. H., & Rooney, P. M. (2003). Response rates for mail surveys of nonprofit organizations: A review and empirical test. *Nonprofit and Voluntary Sector Quarterly*, 32, 252-267.
- Harland, C. M., Caldwell, N. D., Powell, P., & Zheng, J. (2007). Barriers to supply chain information integration: SMEs adrift of eLands. *Journal of Operation Management*, 25, 1234-1254.
- Holton, J. (2007). The coding process and its challenges. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 265-290). Thousand Oaks, CA: Sage.
- Laforet, S., & Tann, J. (2006). Innovative characteristics of small manufacturing firms. *Journal of Small Business and Enterprise Development*, 13, 363-380.
- Lefebvre, V. M., De Steur, H., & Gellynck, X. (2015). External sources for innovation in food SMEs. *British Food Journal*, 117, 412-430.
- Low, S., & Brown, J. (2016). Manufacturing plant survival in a period of decline. *Growth and Change*, 48, 297-312.
- Malecki, J., & Poehling, M. (1999). Extroverts and introverts: Small manufacturers and their information sources. *Entrepreneurship & Regional Development*, 11, 247-268.
- Massey, D. (2008). Uneven development: Social change and spatial divisions of labor. In T. J. Barnes, J. Peck, E. Sheppard & A. Tickell (Eds.), *Reading economic geography* (pp. 111-124). Malden, MA: Blackwell.
- Millward, H., & Lewis, A. (2005). Barriers to successful new product development within small manufacturing companies. *Journal of Small Business and Enterprise Development*, 12, 379-394.
- National Academies. (2013). *21st Century manufacturing: The role of the manufacturing extension partnership program*. Washington, DC: Author.
- Oberhauser, A. M., Pratt, A., & Turnage, A. (2001). Unraveling Appalachia's rural economy: The case of a flexible manufacturing network. *Journal of Appalachian Studies*, 7, 19-45.
- Pinkus, G., George, K., & Ramaswamy, S. (2017, November 30). The first step to fixing U.S. manufacturing. *Harvard Business Review*. Retrieved from <https://hbr.org/2017/11/the-first-step-to-fixing-u-s-manufacturing>
- Reidolf, M. (2016). Knowledge networks and the nature of knowledge relationships of innovative rural SMEs. *European Journal of Innovation Management*, 13, 317-336.
- Rothwell, R. (1991). External networking and innovation in small and medium-sized manufacturing firms in Europe. *Technovation*, 11, 92-112.
- Sommers, P. (1998). Rural network in the United States: Lesson from three experiments. *Economic Development Quarterly*, 12, 54-67.
- Theodore, N., & Weber, R. (2001). Changing work organization in small manufacturers: Challenges for economic development. *Economic Development Quarterly*, 15, 367-379.
- U.S. Census. (2010). *American community survey 5-year estimates*. Retrieved from <https://factfinder.census.gov>
- U.S. Census. (2015). *County business patterns*. Retrieved from <https://www.census.gov/data/datasets/2015/econ/cbp/2015-cbp.html>
- U.S. Small Business Administration. (2017). *Table of small business size standards matched to North American Industry Classification System Codes*. Retrieved from <https://www.sba.gov/contracting/getting-started-contractor/make-sure-you-meet-sba-size-standards/table-small-business-size-standards>
- Wojan, T., & Parker, T. (2017). *Innovation in the rural nonfarm economy: Its effect on job and earnings growth, 2010-2014*. Retrieved from <https://www.ers.usda.gov/webdocs/publications/85191/err-238.pdf?v=0>

Author Biographies

Sarah Lyon-Hill is the senior economic development specialist at the Virginia Tech Office of Economic Development. She specializes in workforce development, economic impact, and emerging technology. Her dissertation research examines the role of arts and culture nonprofits in community development.

Margaret Cowell is an associate professor in urban affairs and planning at Virginia Tech. She studies economic development and resilience in distressed communities. Her book, *Dealing With Deindustrialization: Adaptive Resilience in Eight Midwestern Regions* (Routledge), was published in 2014.

Scott Tate is the associate director at the Virginia Tech Office of Economic Development. His areas of expertise include regional development, entrepreneurship, and innovation. He has conducted several workforce and economic development projects across Virginia.

Albert Alwang is an economic development specialist at the Virginia Tech Office of Economic Development. He conducts research on economic impact, state economic and trade policy, and university outreach. He received his master's degree in agricultural economics in 2017.