Rural Industry Clustering Towards Transitional Rural-Urban Interface

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Abstract. Rural industrialization seems to be attractive for policymakers looking for counter-urbanization efforts – and nowadays peri-urbanization forces – in line with growing decentralized autonomy of local Indonesian authorities. To promote better rural development, an extended growth pole strategy has been introduced as well as an agropolitan approach and its derivatives. In fact, there is little evidence for their success; rural autonomy remains elusive instead. However, institutional capacity of rural authorities and organizations still fails to deliver rural development initiatives properly. This research was aimed at examining this issue by looking at rural industry clustering in the Greater Solo Region, Indonesia as a response against extended urbanization in peripheral regions. The study focused on batik industry clustering in the rural periphery of Solo City, which provides a transitional rural-urban interface necessary to drive rural independence. Having inherited the batik tradition underpinned by an agriculture-led peasant society, the rural batik industrialization has reinforced the socio-economic transition from a purely agrarian society to a mixed rural-urban society. This study employed an explanatory sequential mixed-method approach, where a quantitative spatial analysis was used to identify the expansion of urbanized areas in villages, and a qualitative case study analysis to figure out the socio-economic shift in rural livelihoods. The results showed that physical spatial changes in these villages do not conform to the socio-economic change into an urban industrial society in a substantial way. Rather, the local villagers preserve an informal economy to support the existence of a mixed rural-urban livelihood.

1. Introduction

In the theoretical and empirical domains, extended urbanization has raised many controversies regarding its effectivity in accelerating development in peripheral regions. For more than a century the debate on urban-led development has recursively placed more importance on urban regions over their peripheries, positing a predominantly top-down spatial development approach. Neither the opposite nor a more balanced approach seems possible. The growing importance of urban regions for promoting development can be traced back to long-lasting periods of urbanization around the world. During the 1800s backwards, the urban population size was about three percent out of the world population of less than one billion. In the early 1900s, the world population entered the age of rapid urbanization, where the urban population size was multiplied five times at 15 percent, comprising 1.6 billion urban inhabitants. In the decades that followed, the urban size multiplied even faster, at 29 percent in 1950, and 43 percent in 1990. Recently, the urban population size has hit 54 percent in 2014, or equivalent to 3.9 billion urban inhabitants, and has been predicted to reach 66 percent by 2050, and still counting [1,2]. During the long history of worldwide urbanization, urban functions have become more complex. Cities not only function as centers for manufacturing and trade of rural commodities but also for political, social, cultural, and defense activities that benefit the whole nation thanks to the advances of technology,

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transportation access, and communication networks [1,3,4]. With the fluid heterogeneity of the urban functionalities, the urbanization process has resulted in a new way of life under the notion of urbanism, which has brought the desired standard of living beyond city limits [5,6].

Early urban-centered development dates back to the ancient cities of Egypt, India, Mesopotamia, China, Greece, and many parts of the world that showed a salient state-oriented centralism. Cities were built to represent a predominantly authoritative government regime through the manifestation of an axial-geometric internal structure, surrounded by a fortress-like wall, filled with gigantic-scale buildings, sculptures, monuments, gardens, and public open spaces and facilities. Cities during these times were a symbol of government power to perform multiple functions, from (mainly) military and defense to trade and political activities, which more benefited aristocrats, high-ranked bureaucrats and bourgeois elites rather than the general public. In the meantime, rural and countryside development was ignored and seen as no more than a residual space for nature [7–10]. The rise of the Industrial Revolution in the late 1700s, which coincidentally took place contemporaneously with Adam Smith's laissez-faire capitalism introduced in 1776, shifted the ways cities functioned following the permeation of the market mechanism in decision making. Many large cities turned into manufacturing centers supported by modernized transportation systems, including roads, railways, and riverways. The steam machine invented by James Watt in 1769 broke the city walls down through mechanization of manufacturing products and mobilization of people from the urban fringes. On the other hand, new industrial towns were built in the countryside in response to lower transportation costs of coal exploitation for the sake of manufacturing factories. At the end of 19th century, the growth of industrial cities had become a new fashion in urbanization, marked by capital intensification directing spatial planning and development supported by improved communication networks and new technological inventions [7–1]. Spatial planning related to mining extraction and transportation networks influenced the growth of large cities and smaller towns. High consumption by industrial cities of mining resources contributed to spatially discontinuous patterns between older cities and new industrial towns. The emerging number of slum areas and unhealthy urban conditions soon appeared as the main feature of these industrial cities, where private companies took control over the spatial development process.

After 150 successive years of urban industrial-led spatial planning, city growth received a wide range of criticism over its failure in providing better living space. Urban degradation became a major issue for policymakers due to severe air pollution, traffic congestion, slumification, contagious diseases, and high crime levels. Between the late 1800s and the early 1900s, the city beautification era was a response to the immediate call for urban lifestyle improvement. Ebenezer Howard and Patrick Geddes were the pioneers in this advent of urban rehabilitation. Howard's radical utopian notion of the Garden Cities of Tomorrow (1898) promoted a romantic throwback to preindustrial city development. He proposed new town development in the countryside around large factories. The so-called garden city, built far from city centers, was meant to establish new working-and-living urbanism in the city outskirts by combining urban industrial routines with a natural countryside environment [7–10]. Similarly, but in a slightly different direction, Geddes' notion of Cities in Evolution (1915) underlined the importance of human interaction with the environment, for which human geography supplies the scientific basis of understanding. He pointed out that the tendency of town development in the suburbs should consider a regional sphere of influence of towns interconnected by various transportation networks following the natural landscape. Planning intervention, therefore, should take into account the locational characteristics of the natural region where the proposed urban economic activities will take place [7–10]. During this rapid urbanization era, the second wave of urbanization stressed the importance of the contribution of the countryside to regional urban-centered spatial planning and development. Suburbs and rural regions played a key role in supporting outward extending urbanization. Broader functionalities of the countryside to provide alternative working and living space for urban inhabitants initiated attempts to tackle old city degradation by utilizing better technology and accessibility to support the mobilization of people and resources beyond the city borders.

The continuation of rapid urbanization in the following decades emerged as a result of market capitalization in (mostly) large cities. Many investments in city development projects initiated by state planning institutions made the Geddesian greenbelt city concept flourish across the countryside, particularly in North American and European cities. Increased state-led urban planning interventions

during the pre-World War II period were aimed at promoting city-regions to boost the national economy. As a result, the growing number of new metropolises that arose from the intensified urbanization process would serve laissez-faire market capitalism. However, this trend somewhat declined between the Great Depression era of the 1930s and the early period of World War II. Due to the massive economic downturn and increasing political instability and insecurity worldwide, the urbanization slowdown forced former industrial cities and countryside towns to deal with budget cuts. Most government budgets were allocated to finance war, economic recovery, and social security programs. Limited physical development projects were confined to the hands of central government to finance the most prioritized projects only, such as those executed by the Tennessee Valley Authority (TVA). These projects were aimed at supporting national basic needs, including the provision of clean water, electricity, sanitation and affordable housing while the government was struggling with various urban degradation problems [7–10]. Such ivory tower projects thus became a new trend of top-down spatial planning along with the withdrawal of decentralized urbanization and suburbanization processes. Resource accumulation was centralized and managed by central government institutions for ensuring adequate technical capacity and financial assistance to project implementation.

The post-war period of urban expansion from the 1940s to 1970 displayed striking debates on national and spatial development approaches. The contestation of two major development paradigms, i.e. balanced and unbalanced growth theories, was the lasting result of the immediate government reaction to the severe impact of the war vis-à-vis heightened public expectations towards comprehensive recovery programs. Basic needs fulfillment remained the main public concern, aligned with job creation, social security, human shelter, and improved living condition programs. The balanced-growth scholars, such as Paul Rosenstein-Rodan and Ragnar Nurkse, proposed an equal-development approach by promoting simultaneous development projects to supply massive public goods to the entire country. Arguably, this approach could improve the capacity of both public and private institutions in providing basic needs and consumer goods to the market, which in turn would lead to economic recovery as well as social welfare [11–15]. In contrast, the proponents of unbalanced growth suggested intensification of prioritized sectors for ensuring a higher return on investment through limited resource mobilization efficiency. Therefore, strategic projects were more preferred to stimulate growth of downstream industries. Prominent proponents of the unbalanced-growth theory were scholars such as Walt Whitman Rostow, Albert Otto Hirschman, and Gunnar Myrdal [13,15–17], to name a few.

Following these debates, spatial development policies were polarized into two schools: development from below and development from above. The development-from-below school adhered to balanced-growth principles according to which inward-looking rural development strategies were designed to protect rural assets and resources from urban overexploitation. Selective spatial closure, territorialism, integrated rural development and endogenous development were popular phrases circulated by proponents of this school such as Walter Stohr and Franz Tötdling [15,18,19]. They were much inspired by the works of François Perroux and later supported by Jacques Boudeville, who advised the growth pole strategy in 1955, which suggests that economic development spreads from certain leading industries (mostly) concentrated in urban areas. This theory was aligned with Hirschman's trickle-down concept and polarization effects and Myrdal's concept of spread and backwash effects of economic development. It was argued that the urban industrial sector will accumulate resources from peripheral and rural regions in the most efficient way to produce higher added value of goods and increasing returns to scale (polarization or backwash effect), and then spread the induced development benefits to the rest of economy (trickle-down or spread effect) [15,18,20]. Consequently, urban-biased development has been a major concern in national and regional development since the 1950s, associated with the emerging tensions between balanced- and unbalanced-growth scholars [13,15,21,22]. Perroux's growth pole strategy could perhaps be accused of being part of the widespread urban-biased development phenomenon in the modern era, from which the rural-urban dichotomy has emerged as a by-product of urban-based decision-making processes [23–25].

From the 1980s onwards, rural-urban dichotomy issues have emerged in public policies beyond the increasing global trend of megacity development. As metropolises expanded, so did many urban regions to form global urban networks; the parasitic role of urban exploitation over its peripheral and rural regions has occurred at an unprecedented rate that could never have been imagined a century ago

[2,3,26]. The urban sprawl phenomenon, which marked the spatial development landscape between the 1990s and 2000s, has stirred the suburbanization process – followed by the peri-urbanization process a few decades later – conveying multidimensional effects of the uncontrolled growth of megacities towards more integrated spatial development at both national and regional levels. Globalization forces that welcomed the upcoming digital economy era have converged the global megacities into an open world market system, thanks to borderless foreign direct investments and post-Fordist global production networks. Despite the increased competitiveness of megacities and nations, many national governments have been losing power and sovereignty in directing spatial development properly. Many multinational corporations have taken over spatial development control through investments in large-scale projects, privatization, business partnership, and domestic firm acquisition [27–31]. In contrast, the neglected rural development has caused greater dependency on global products and agencies, including the global culture of urbanism, while rural inhabitants are trapped in intergenerational poverty. Meanwhile, the role of small and medium-sized towns in preventing the deteriorating effects of such extended urbanization has disappeared, particularly due to the absence of well-articulated urban systems at the regional level. Therefore, the lasting rural neglect has worsened regional inequality incidence in contrast to the so-called modernity inducement in rural development [14,32].

However, the search for an integrated spatial development to get rid of the rural-urban dichotomy has received much attention from policymakers and practitioners at least since the 1970s. Many national governments were keen to search for alternative spatial development strategies to make the most of the urban growth centers' advantages in the world market system. At the same time, rural development initiatives were intensified to improve their capacity and independence in managing local resources as well as urban network opportunities. These alternatives included urban functions in rural development, and agropolitan and rural-urban linkage strategies. The basic principle of these alternatives was to focus on local resource development by connecting rural centers with existing urban systems and investing in urban facilities and infrastructure to support rural development [14,18,25,32,33]. In fact, counter-urbanization efforts to relieve the rural-urban divide seem difficult to realize since rural-based developments may be promising but cannot be successful without urban assistance. Therefore, this paper aims to examine rural industry clustering as a response against extended urbanization in peripheral regions. Arguably, rural industrialization could be a solution by facilitating transitional rural-urban interfaces in small towns and peri-urban settlements instead of allowing parasitic exploitation of urban forces.

2. Methods

This study employed an explanatory sequential mixed-method approach, where quantitative spatial analysis was used to identify the expansion of urbanized areas in villages, and qualitative case study analysis to figure out the socio-economic shift in rural livelihoods. According to [34], this approach is used to deepen the researcher's understanding of the phenomenon observed by more detailed examination of selected cases, objects, samples or indicators that have served the research interest in the former quantitative phase. The rural-to-urban land use change in the rural periphery of the greater Solo region (GSR) represents the case of interest that guides a limited exploration of the socio-economic shift pattern, particularly in newer urbanized rural areas. The underlying hypothetical assumption behind the use of such a mixed-method approach is that the physical land use changes correlate positively to the socio-economic changes of space from rural to urban sectors. Arguably, urban land use should include non-agriculture activities with more complex and heterogeneous relations between actors.

2.1. Quantitative data collection and analysis

In the quantitative research phase, data on land use change were collected by comparing settlement classification changes published in population census documents (*Sensus Penduduk*/SP). These documents are published by the Representative Central Bureau of Statistics (*Badan Pusat Statistik*/BPS) in each local administration of GSR, consisting of one municipality and six regency administrations, i.e. Surakarta municipality, Boyolali regency, Sukoharjo regency, Karanganyar regency, Wonogiri regency, Sragen regency, and Klaten regency. The population census that was undertaken in 2000 (SP-2000) and 2010 (SP-2010) accounted for the primary database to sort out the *desa perkotaan* (urban villages) and

desa perdesaan (rural villages) classification. For the purposes of more accurate mapping, the database was confronted with the existing rural potentials (*Potensi Desa*/Podes) dataset, spatial plans (*Rencana Tata Ruang Wilayah*/RTRW), and field observations. The collection of all these data took place from 2015 to 2017 with some adjustments made wherever necessary, particularly because of missing data and inaccuracies. With the support of ArcGIS software the collected data were then analyzed by utilizing a spatial urban-rural land use distribution map.

The next data collection focused on batik firm distribution across the region. The initial data sources were obtained from the Local Planning Authority (*Badan Perencanaan Pembangunan Daerah*/BAPPEDA) and BAPPEDA's arm-length quasi-government institution called Forum for Economic Development and Employment Promotion (FEDEP). The data gathered were verified through a series of focus group discussions (FGDs) and in-depth interviews involving batik cluster organizations, prominent batik entrepreneurs, the Local Agency for Industry and Trade Services (*Dinas Perindustrian dan Perdagangang/DISPERINDAG*), the Local Agency for Cooperatives and Micro, Small and Medium-sized Enterprises (*Dinas Koperasi dan Usaha Mikro, Kecil, dan Menengah*/DISKOP-UMKM), village government heads, academics, informal leaders, and non-governmental organizations (NGOs). Collection of the data was undertaken between 2015 and 2017 and double-checked through field observations to ensure that the list of existing batik firms was up to date. With the exception of Surakarta municipality, which has been one of the leading nationwide batik industry centers for decades, the locations of all batik firms were verified directly in the field. After that, the digital mapping of the spatial distribution of batik firms was accomplished, and the result was overlaid with the prior urban-rural land use distribution map (Figure 1).

2.2. Qualitative data collection and analysis

In the qualitative research phase, this study focused on collecting and analyzing data and first-hand information from the FGDs and in-depth interviews. The main objective of this phase was to figure out the socio-economic shift in rural livelihoods, particularly in urban villages across the peripheral regions of Surakarta municipality, which has been performing as the growth center for Solo Raya regionalization. Special attention was paid to batik industry clustering through which rural industrialization is taking place to carry out rural-urban interface patterns in particular. Some key elements of clustering that were considered as influencing the socio-economic shift of rural livelihoods are the shared use of public infrastructure (e.g. roads and communication), facilities (e.g. workshops, training centers, and showrooms), economic linkages (e.g. inputs, joint production, and marketing channels), social capital (e.g. trust and norms, family ties and social networks), and institutional capacity (e.g. community organizations, rules of the game, and collaborative partnership).

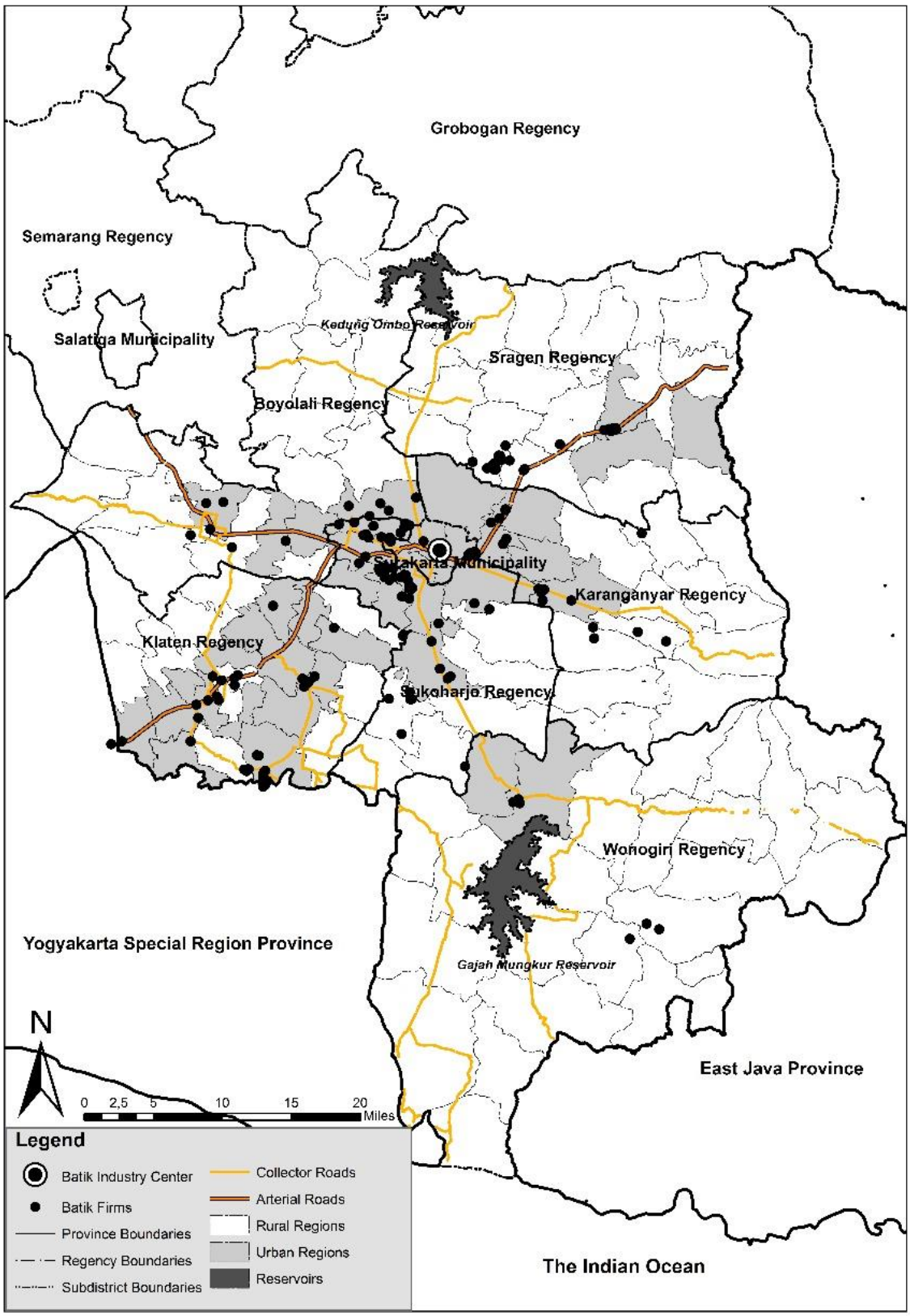


Figure 1. Spatial distribution pattern of batik firms in greater Solo region

3. Results and discussion

In general, the emergence of batik industry clusters in GSR is rooted in the batik tradition of Surakarta, even though many of the existing batik entrepreneurs and traders no longer consistently maintain their business cycle with authentic batik products. Recently, many batik products from other production centers such as Yogyakarta and Pekalongan have overwhelmed the local batik markets, creating a missing stickiness of the local batik identity against a great variety of competitive batik products. Since the 2000s, the local governments have been keen to revitalize the local batik industry by promoting the building of batik industry clusters in GSR's peripheral villages, particularly in response to the central government's campaign for promoting batik products as a national identity through the official declaration of *Hari Batik Nasional* (National Batik Day) on October 2nd, 2009.

Despite the growing interest of local governments and batik industry players to successfully develop batik industry clusters, their emergence, in fact, has raised anxiety regarding the future of rural industrialization in promoting rural independence spatially and economically. This study began with a cautionary awareness that rural industrialization may encourage transitional rural-urban interfaces into which rural communities and settlements could transform from below to become more urbanized, with minimum dependencies on the core growth center. Arguably, the current batik industry clusters can fulfill that promise because of the abundance of resources to support the local batik industry revival. The following sections will further discuss this issue with exclusion of the Boyolali regency case, primarily because the local batik industry has been created from zero only in recent years so that presumably they have neither the so-called inherited batik tradition nor historical connections with the well-established batik industry in GSR.

3.1. Extended urbanization trend

The urbanization pattern in GSR has demonstrated de-urbanization and rurbanization (rural urbanization) phenomena simultaneously since the 1990s. While the urban population in Surakarta is declining, the opposing trend has been occurring in other subregions. Not surprisingly, Surakarta faces a very limited territorial coverage of 44.04 km^2, with more than a half million urban inhabitants, creating out-migration and urban space expansion outwards to its periphery. The immediate effect of such urban expansions is experienced by the adjacent subregions, i.e. Sukoharjo and Karanganyar, along the major road axis Surakarta-Surabaya. Somewhat different to this pattern, the growth of urbanized areas in Klaten and Sragen is not only affected by peri-urbanization (peripheral urbanization) spillover from Surakarta but also by endogenous rurbanization dynamics. From Figure 1, we can observe discontinued peri-urbanization from Surakarta outwards as indicated by the existence of rural regions inbetween. Table 1 shows this pattern by depicting the urban population growth trends.

Table 1. Urban population trends, 1980-2010

		1980	1990	2000	2010
Surakarta		469,532	504,176	490,214	499,337
	%	*43.57*	*30.19*	*18.07*	*16.21*
Boyolali		42,623	128,494	235,307	306,090
	%	*3.96*	*7.69*	*8.67*	*9.94*
Sukoharjo		126,811	324,214	539,024	632,367
	%	*11.77*	*19.41*	*19.87*	*20.53*
Karanganyar		76,178	148,860	336,170	414,969
	%	*7.07*	*8.91*	*12.39*	*13.47*
Wonogiri		36,607	108,852	164,143	190,450
	%	*3.40*	*6.52*	*6.05*	*6.18*

Sragen		56,985	70,621	233,474	277,310
	%	*5.29*	*4.23*	*8.61*	*9.00*
Klaten		268,805	384,896	714,535	759,450
	%	*24.95*	*23.05*	*26.34*	*24.66*
Greater Solo		**1,077,541**	**1,670,113**	**2,712,867**	**3,079,973**
	%	***100.00***	***100.00***	***100.00***	***100.00***

3.2. Infrastructure

The availability of supporting infrastructure is an obligatory condition for any industrialization to continue for a long time. A reliable road network ensures flows of input-output linkages and exchange of knowledge and innovation among actors. The local batik industry clusters in GSR are connected with either the national arterial or the provincial collector road system, except those in Wonogiri regency, so that the local batik firms there are quite isolated. Figure 1 shows that the so-called batik industry cluster in this region is located in the middle of nowhere in Tirtomoyo subdistrict, comprising very few batik firms. Actually, the absence of a reliable road network and transportation system does not obstruct the spread of the batik industry to remote areas. A salient feature of the batik industry is that as a folkloristic home-based industry it enacts a cultural tacit knowledge transfer across generations, which enables the actors to adapt, modify, and develop batik production skills in compliance with local social systems. It is the immaterial possession of batik production creativity and innovation that matters in determining local batik industry growth instead of the physical infrastructure. Therefore, access to knowledge infrastructure is more important for supporting local batik industry growth.

3.3. Facilities

Some specific facilities to support batik industry existence are schools and training centers, workshops and showrooms, exhibition venues, and batik specific markets. All these types of facilities can be found in Surakarta only, while the remaining GSR subregions have no schools, training centers or markets specific to batik industry needs (Table 2). However, informal batik training is available in each local batik cluster occasionally, hosted by prominent batik entrepreneurs, community organizations, government agencies, or external parties. Regarding the absence of batik specific markets, local batik producers and traders prefer to rely on annual batik exhibition events.

Table 2. Specific facilities to support local batik industry

Subregion	Types of specific facilities			
	School and training center	Workshop and showroom	Exhibition venue	Batik specific market
Surakarta	√	√	√	√
Sukoharjo	-	√	√	-
Karanganyar	-	√	√	-
Wonogiri	-	√	√	-
Sragen	-	√	√	-
Klaten	-	√	√	-

To date, there is a division of spatial production chains between Surakarta and its peripheries. As a core industry region, Surakarta more functions as a national center of the batik market and industrial research and development. Newer batik motifs and styles are mostly found in Surakarta as well as the improvement of batik techniques and materials. On the other hand, the GSR subregions focus on batik production and labor regeneration. Many batik workers of the younger generations come from peripheral villages in response to the recent local batik industry growth.

3.4. Input linkages

More than 80 per cent of the raw material supply for the entire GSR batik industry comes from suppliers in Surakarta. Exceptionally, the local batik industry clusters in Klaten and Sragen can find alternative suppliers instead of maintaining high dependency on those in Surakarta. This finding is interesting considering that large textile companies are located in Sukoharjo and Karanganyar. Figure 2 below explains batik industry interdependence in GSR.

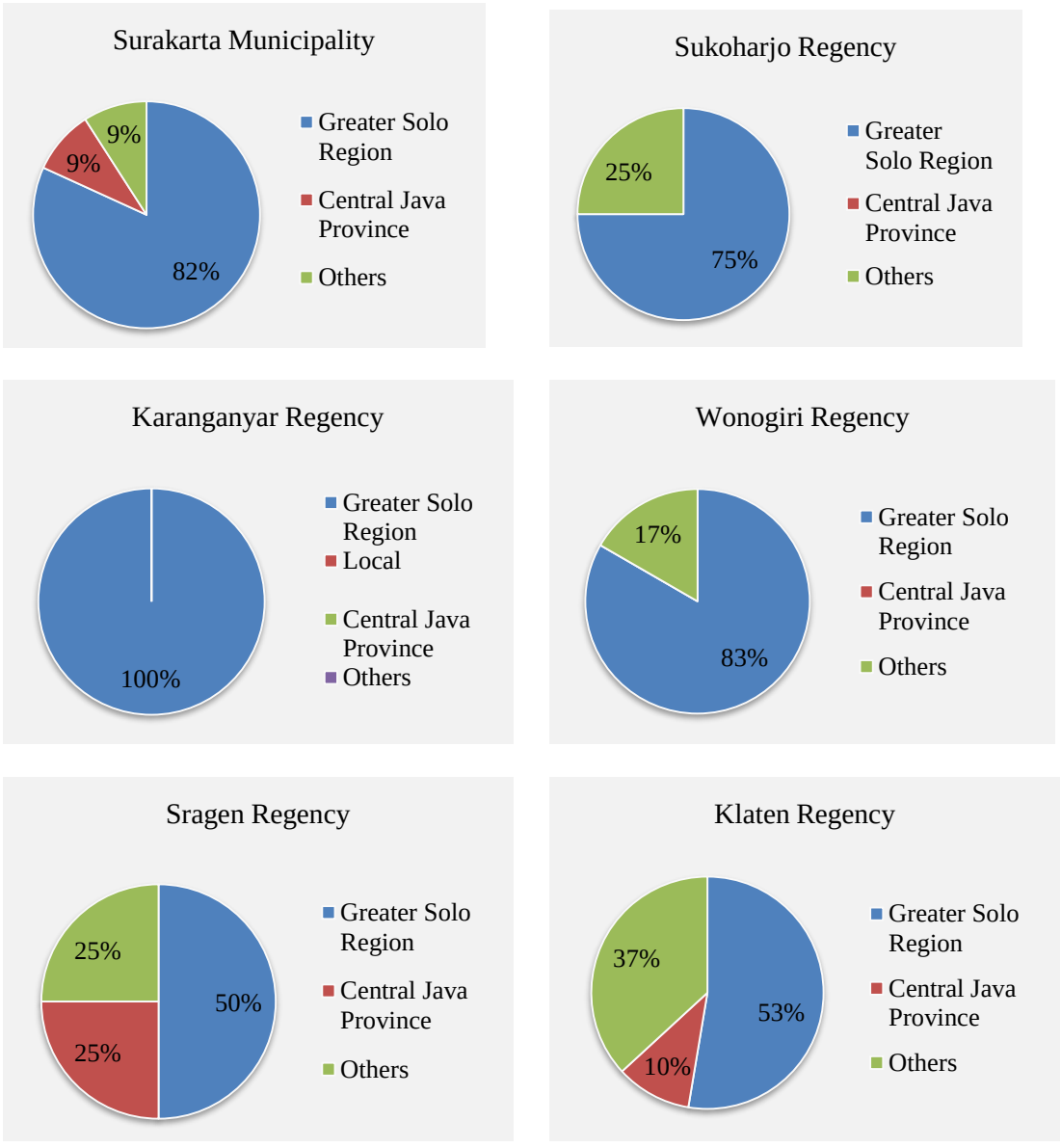


Figure 2. Input linkages pattern

3.5. Production network

Joint production networks cannot be found clearly in each batik industry cluster. The only forms of joint production are subcontracting and coordinated division of labor within the clusters. The former form is very common everywhere when the larger batik producers assign their smaller partners to produce a certain amount of batik works based on contractual agreements. The latter is found limited to Klaten and

Karanganyar, where a local batik business group distributes batik works equally among the group's members.

3.6. Output linkages

Regarding marketing destinations, the local batik industry cluster in GSR has developed many different markets, not only delivering batik products to the local batik market. Even though the local GSR markets remain prospective, many local batik producers have expanded their markets into various destinations. Again, the local batik industry clusters in Klaten and Sragen have managed to find market alternatives for selling their products. Figure 3 presents the output linkage patterns of the local batik industry clusters in GSR.

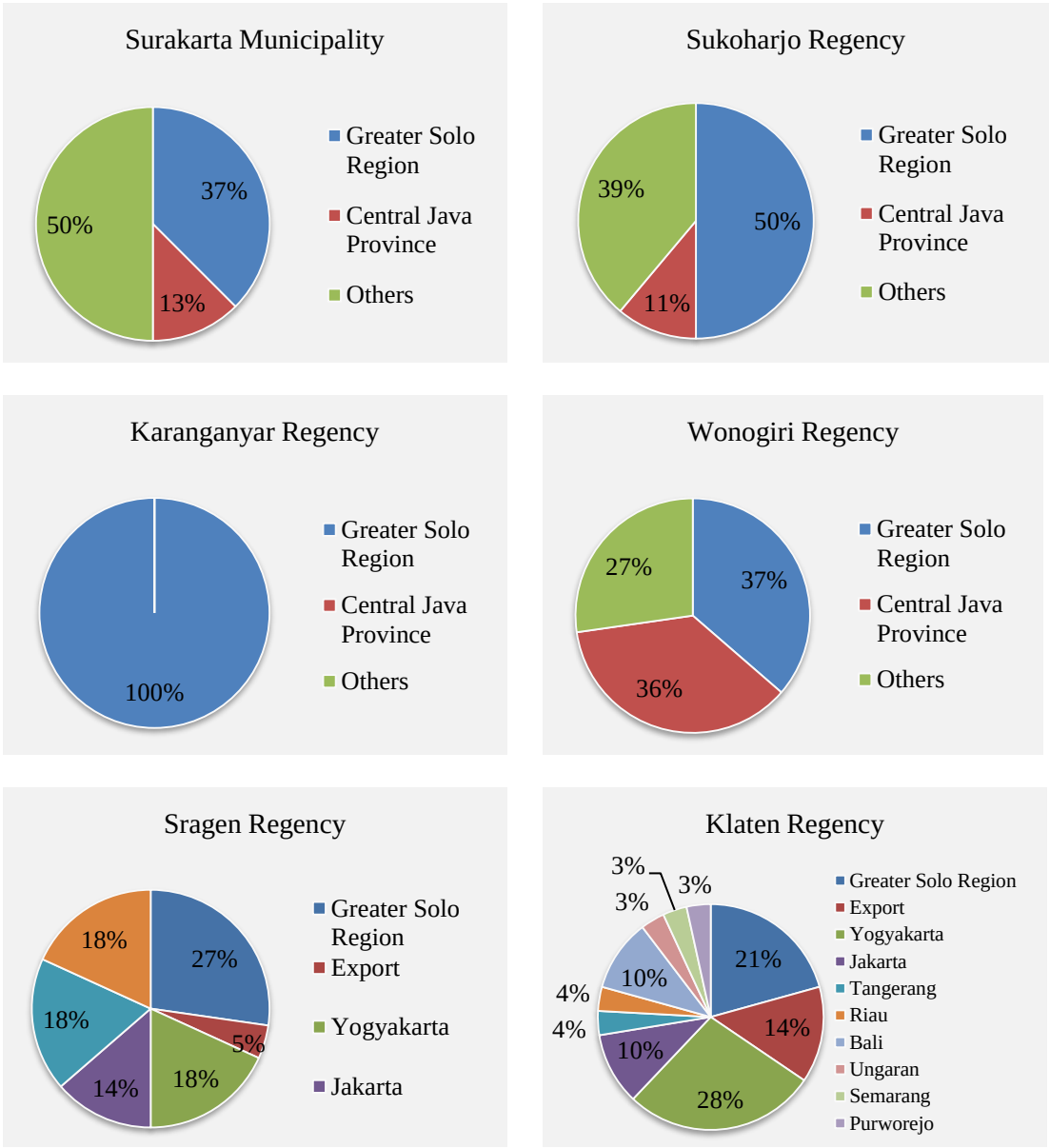


Figure 3. Output linkages pattern

4. Conclusions

The recent emergence of rural batik industry clustering in the GSR peripheral regions is a good sign for rural-to-urban transformation. Traditionally, batik industry has a strong connection with rural agriculture activities since the old practices of batik industrialization are associated with harvesting period breaks. While waiting for the upcoming cultivation period, the female agriculture workers were used to spending their spare time doing batik works. In the modern era, such practices still exist, even though very limited and in particular places. The greater exposure of the local batik industry players to more competitive markets has somehow changed their views on how to run a batik business properly. More modernized batik industrialization has raised their awareness to seek for self-organizing solutions by establishing community organizations, business networking, and technological adoption to survive in the market.

However, the most important findings of this study are the sustained high dependency of the local batik industry in the GSR peripheral regions towards the batik industry center in Surakarta. Unfortunately, while such rural industrialization growth has not matured yet, the extended urbanization in these regions has failed to encourage the establishment of proper infrastructure and facilities required to achieve business independence. Instead of encouraging the local villagers to become more modernized, they tend to preserve the current informal economy to support the existence of a mixed rural-urban livelihood.

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