LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : *PROSIDING*

Judul karya ilmiah (paper) : Rural Industry Clustering Towards Transitional Rural-Urban Interface
Jumlah Penulis : 1 orang
Status Pengusul : **P. Nugroho**
Identitas prosiding :
a. Judul Prosiding : IOP Conference Series:Earth and Environmental Science
b. ISBN/ISSN : 1755-1315
c. Tahun Terbit/tempat pelaksanaan : Agustus 2018
d. Penerbit/organiser : IOP Publishing
e. Alamat repository PT/web : https://iopscience.iop.org/article/10.1088/1755-1315/158/1/012055
f. Terindeks di (jika ada) : SJR 0,17 (2018) dan Scopus 0,44 (2018)

Kategori Publikasi Makalah (beri ✓pada kategori yang tepat) :
☑ *Prosiding* Forum Ilmiah Internasional
☐ *Prosiding* Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal *Prosiding*		Nilai Akhir Yang Diperoleh
	Internasional (30)	Nasional ( )	
a. Kelengkapan unsur isi paper (10%)	3		2,8
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,8
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		8,8
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9		7.0
Total = (100%)	**30**		27,4
Nilai Pengusul : 27,4 x 100% = 27,4			

Catatan Penilaian paper oleh Reviewer :
a. Seluruh komponen artikel telah disampaikan dengan baik dan lengkap.
b. Analisis yang dilakukan mendalam, mengkaitkan isu keruangan desa-kota dengan klaster ekonomi.
c. Referensi yang diacu dalam artikel cukup ekstensif dan terbaru di bidangnya. Metode yang digunakan menggabungkan pendekatan kualitatif dan kuantitatif.
d. Artikel dipublikasikan pada prosiding terindeks Scopus. Analisis kemiripan menurut Turnitin sebesar 9%.

Semarang,

Reviewer 1,

Dr. Ir. Jawoto Sih Setyono, MDP
NIP. 196605061995121001
Departemen PWK, FT. Undip

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	Internasional (30)	Nasional ( )	
a. Kelengkapan unsur isi paper (10%)	3		3,0
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		5,0
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		7,0
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9		9,0
Total = (100%)	**30**		24,0
Nilai Pengusul : 24,0 x 100% = 24,0			

Catatan Penilaian paper oleh Reviewer :

a. Artikel disusun sesuai *guideline for author*; judul dan IMRaDC sesuai.

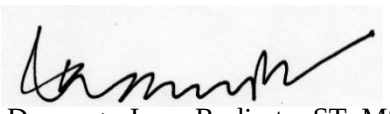
b.Artikel sesuai bidang ilmu (Regional Economic Development); tidak terdapat rujukan dalam pembahasan (0%).

c. Terdapat 10 rujukan mutakhir (5 dan 10 tahun) dari 34; metode kualitatif dan kuantitatif disajikan secara umum.

d. Prosiding terindeks Scopus; tersedia *online*; kualitas baik; SJR 0,17 (2018)

Semarang,

Reviewer 2,



Dr.sc.agr. Iwan Rudiarto, ST, MSc.
NIP. 197403271999031002
Departemen PWK FT. Undip

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : *PROSIDING*

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☑ *Prosiding* Forum Ilmiah Internasional
☐ *Prosiding* Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a.Kelengkapan unsur isi paper (10%)	2,8	3,0	2,9
b.Ruang lingkup dan kedalaman pembahasan (30%)	8,8	5,0	6,9
c.Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	8,8	7,0	7,9
d.Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	7.0	9,0	8,0
Total = (100%)	27,4	24,0	25,7
Nilai Pengusul : 25,7 x 100% = 25,7			

Semarang,

Reviewer 1,

Dr. Ir. Jawoto Sih Setyono, MDP
NIP. 196605061995121001
Departemen PWK FT.Undip

Reviewer 2,

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NIP. 197403271999031002
Departemen PWK FT.Undip

CERTIFICATE OF ATTENDANCE & APPRECIATION

IT IS OUR PLEASURE TO CONFIRM THAT

PRIHADI NUGROHO

MADE AN OUTSTANDING ORAL PRESENTATION ENTITLED

"RURAL INDUSTRY CLUSTERING TOWARDS TRANSITIONAL RURAL-URBAN INTERFACE"

AT THE 1ST ITB CENTENNIAL AND 4TH PLANOCOSMO INTERNATIONAL CONFERENCE
ON INFRASTRUCTURE DEVELOPMENT HELD AT INSTITUT TEKNOLOGI BANDUNG ON APRIL 2-4, 2018

DEAN OF SAPPD
INSTITUT TEKNOLOGI BANDUNG

PROF. WIDJAJA MARTOKUSUMO

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CHAIR OF
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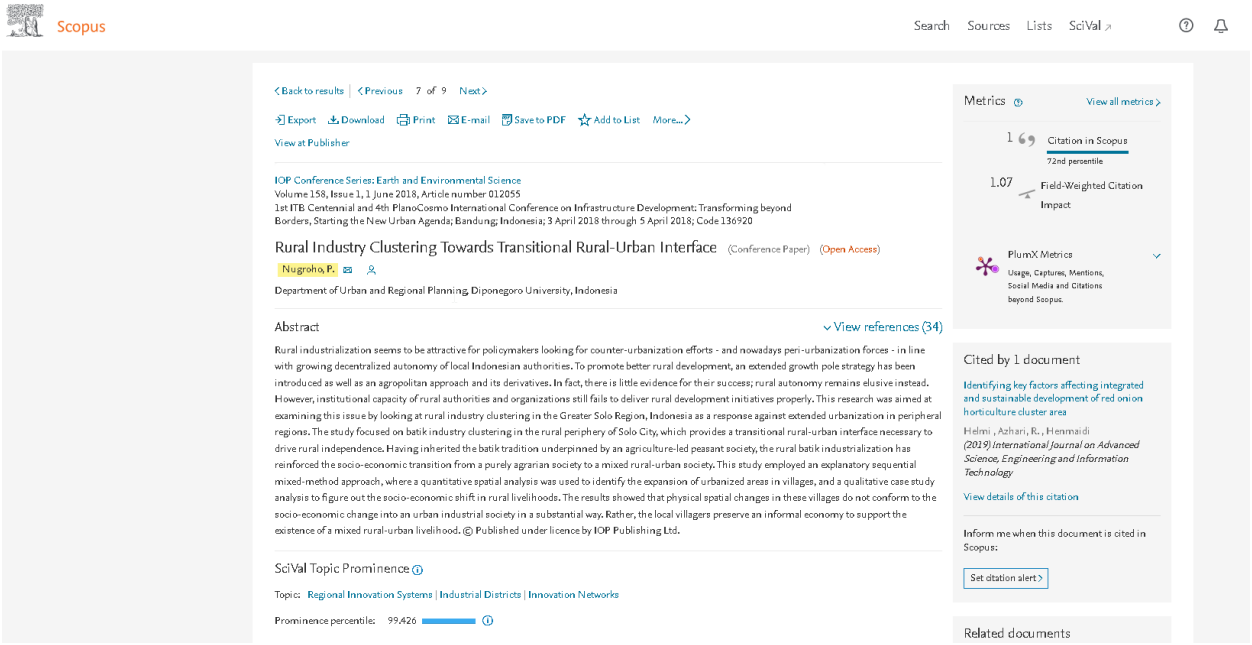
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IOP Conference Series: Earth and Environmental Science
Volume 158, Issue 1, 1 June 2018, Article number 012055
1st ITB Centennial and 4th PlanoCosmo International Conference on Infrastructure Development: Transforming beyond Borders, Starting the New Urban Agenda; Bandung; Indonesia; 3 April 2018 through 5 April 2018; Code 136920
Rural Industry Clustering Towards Transitional Rural-Urban Interface (Conference Paper) (Open Access)
Nugroho, P.
Department of Urban and Regional Planning, Diponegoro University, Indonesia
Abstract
View references (34)
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. © Published under licence by IOP Publishing Ltd.
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Prominence percentile: 99.426
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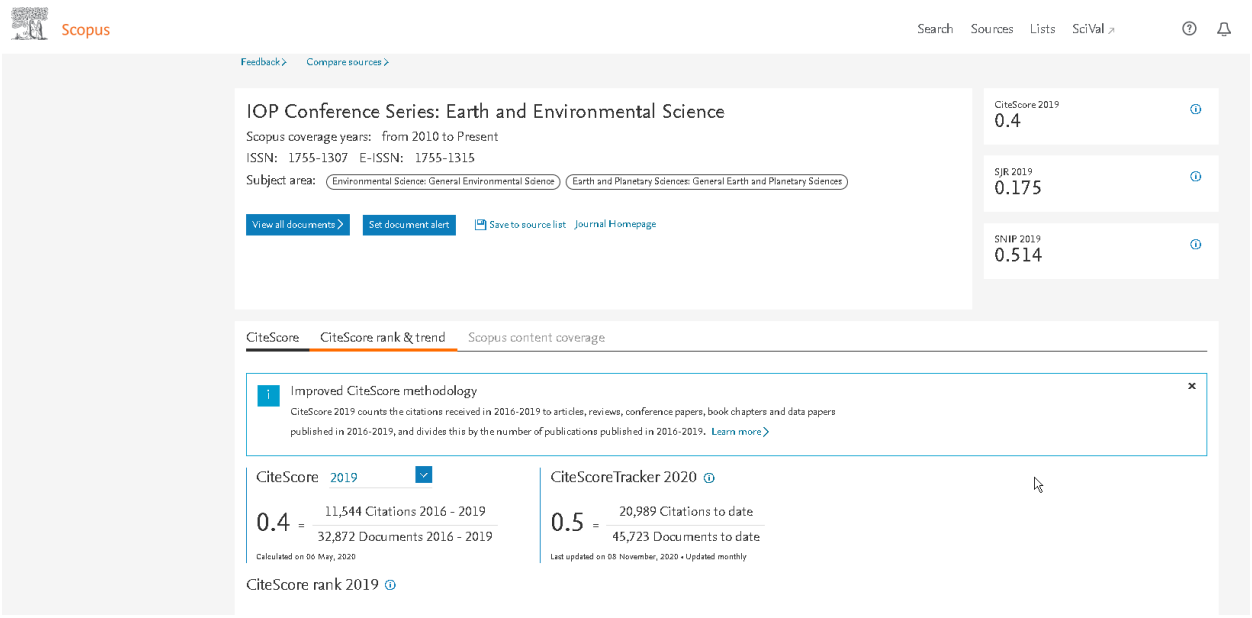
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ISSN: 1755-1307 E-ISSN: 1755-1315
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0.175
SNIP 2019
0.514
CiteScore
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CiteScore 2019 counts the citations received in 2016-2019 to articles, reviews, conference papers, book chapters and data papers published in 2016-2019, and divides this by the number of publications published in 2016-2019.
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The 1st ITB Centennial and 4th PlanoCosmo International Conference

Preface

Economic, social and cultural activities, as well as environmental and human impacts, are increasingly concentrated in and around cities. In the era of planetary urbanization and technological revolution, cities have transformed beyond their proper borders into hinterlands, city-regions, urban corridors, and mega-regions. As a consequence, development challenges have become far more complex than were anticipated in the 'traditional' conception of the 'city'. Transforming beyond their natural and human resources and institutional capacity, cities currently face significant sustainability challenges in terms of governance; land and housing; basic services; food, water and energy security; and disaster risks.

In 2016 the United Nations Habitat Agenda set out the New Urban Agenda (NUA), which seeks to create a mutually reinforcing relationship between this trend of expanding urbanization and development. In this context, urbanization will be seen to become a parallel vehicle for achieving sustainable development. The NUA attempts to address the development trends while also recognizing that cities and metropolitan areas are the major drivers of regional, national, and global economies. The idea of the NUA is to offer guidelines on a range of 'enablers' that can further strengthen the relationship between urbanization and sustainable development. In this context, infrastructure in its widest sense will be a key vehicle for achieving sustainable urban development.

Currently, the NUA has not been properly recognized and integrated in urban, regional, and infrastructure development strategies. In fact, there has been a limited recognition of the NUA in the current academic research and policy-making processes. Considering the urgency of the NUA in the planning, development, and governance of contemporary cities, we should start incorporating the agenda into academic research and policy making, as well as communicating its problems and potential solutions in a scholarly and practically relevant discourse.

Therefore, we held the First ITB Centennial and Fourth Planocosmo International Conference in the main campus of Institut Teknologi Bandung, Bandung, Indonesia, on 2-4 April 2018. The conference theme was "Transforming beyond Borders, Starting the New Urban Agenda". The aim of the conference was to discuss infrastructure, transportation, and planning issues in the context of New Urban Agenda (NUA), which are centered on: *connectivity, inclusiveness, resilience, security,* and *governance*. The conference was a special opening event to commemorate the Centenary of Indonesian Higher Education in Engineering and the 60th Anniversary of Urban and Regional Planning Education in Indonesia. The event was organized by the Urban and Regional Planning Study Program under the School of Architecture, Planning and Policy Development, Institut Teknologi Bandung and the Research Center for Infrastructure and Regional Development, Institut Teknologi Bandung.

While several papers were invited for publication in Journal of Regional and City Planning, these proceedings were prepared as the main publication outlet for most papers presented at the conference. The proceedings consist of 56 selected papers, which are distributed to several interrelated parts resembling the tracks organized during the conference.

The first part, Informal Urbanism and Inclusive Development, consists of five articles focusing on the issues of informality-formality in designing and planning urban spaces in various contexts across the globe. The second part, Urban Land and Housing System, presents six papers in the topics of housing for everyone, housing development and finance, gentrification, and urban heritage. The part of Infrastructure and Transportation System includes 14 papers dealing with infrastructure provision and management, inclusive and sustainable transportation system, technology for Intelligent Transportation System (ITS), Transit Oriented Development (TOD) and compact cities, and megaproject planning and management.

Meanwhile, nine papers in Environmental Planning and Management concentrate the discussion on the topics related to energy security and planning, coastal zone management and marine planning, climate change adaptation, socio-ecological resilience, and green cities and ecotourism. As another part of the proceedings, Disaster Risk Reduction brings together five accepted papers that pay attention to pre- and/or post-disaster reconstruction and rehabilitation planning and management and also community preparedness towards disaster.

Peri-urbanization and Regional Policy is the next part of these proceedings containing five papers, which concerns with infrastructure of peri-urban and suburbanization. Regional Innovation and Smart City System becomes the part of the proceedings comprising nine papers focused on smart city and big data, infrastructure 2.0, planning in a digital era, creativity and innovation, and sharing economy and sharing cities. The last special part is Rural Transformation and Small-Town Planning, which is dedicated to those interested in reading rural-urban linkages with three papers.

These proceedings were not possible to be completed without the restless effort of our technical team. Therefore, our sincere thanks go to our colleagues Fikri Zul Fahmi, Lisna Rahayu, Dika Fajri Fiisabiilillah, Aryani N. Chandramidi, Nabilla Dina Adharina, Yustina Octifanny, Gina Puspitasari Rochman, Sosrowinarsito and Ivanie Destila Sari. Other colleagues in the conference's organizing committee should also be mentioned here, including Adiwan Fahlan Aritenang, Tessa Talitha, Seruni Fauzia Lestari, Farida Khuril Maula, Niken Prilandita, Shanty Yulianty Rahmat, Bea Regina Marcendy, Puspita Dirgahayani, Hansen Sutanto, Saut A.H. Sagala, Nurrohman Wijaya, Sri Utami Purwaningati, Azis Hakim, Bagas Dwipantara Putra, Tri Rahayu Wulansari, Alhilal Furqan, Aliyah Alfianda Dwicahyani, Yunie Nurhayati Rahmat, Rama Arianto, Achmad Fauzan Iscahyono, Tizar Bijaksana, Tika Savitri Hasan, Alvaryan Maulana, Qurrota Aini, Alvin Noviansyah, Dewi Widaningsih, Susi Agustini, Jaja Suhendar. We are also grateful to our colleagues in the Scientific Committee, whose inputs and ideas are remarkable: Tommy Firman, Euginie Birch, Richard Haigh, Eric Sheppard, Deden Rukmana, Haryo Winarso, Pradono, Teti Armiati Argo, Tim Bunnell, Paul Jones, Shabbir Cheema, Terry van Dijk, Sri Maryati, Hastu Prabatmodjo, Harkunti P. Rahayu, Denny Zulkaidi, and Wilmar Salim. We are indebted to our Steering Committee for their kind supports and encouragement: Miming Miharja, Benedictus Kombaitan, Robert Cervero, Richard Legates, Johan Woltjer, Roos Akbar, Arief Rosyidie, Tubagus F. Sofhani, Ibnu Syabri, and Ridwan Sutriadi.

Finally, we are thankful and lucky to have dedicated partners from College of Architecture and Urban Planning, Tongji University, China, including Peng Zhenwei, Zhao Min, Li Zhang, and Chen Chen.

Dr. Delik Hudalah

Chair of the Organizing Committee
The 1st ITB Centennial and 4th PlanoCosmo International Conference

Editorial team
Proceedings of the 1st ITB Centennial and 4th PlanoCosmo International Conference on Infrastructure Development: "Transforming beyond Borders, Starting the New Urban Agenda"

Committees

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Liaison Officer	Tizar Bijaksana, MT.
	Tika Savitri Hasan, MA.
Documentation	Alvaryan Maulana, ST.
	Qurrota Aini, ST.

Overview of Conference Agenda

MONDAY
APRIL 2nd, 2018

08.00 **Registration**

09.00 **Opening**

10.00

10.15 **Keynote Lecture 1:**
The Role of (Local) Government in Establishing Sound (Local) Fiscal System to Enable Equal Redistribution of Urban Value

11.00 **Keynote Speech 1:**
Integration of Strategic Regional Development Strategies with the New Urban Agenda Targets

11.30 **Keynote Speech 2:**
The Role of International Financial Institution in Delivering Smart Urban Infrastructure Financing

12.00

12.10

13.10
- **Plenary 1.1**
  Conventional and Alternative Infrastructure Financing

- **Meet 1**
  JRCP Editorial Board Meeting

14.40

15.10 **Plenary 1.2**
Access to Financial Support for Infrastructure Projects

16.40

17.00 **Dinner Preparation**

18.30 **Welcoming and Dinner Reception**

TUESDAY
APRIL 3RD, 2018

09.00 **Plenary 2**
Sustainable Regional Development

10.30

10.45

11.00 **Plenary 3**
JRCP Plenary on Inclusive Urbanism

12.30

12.45

13.45
- **Parallel 1**
- **Book Launch 1**: Jakarta, Claiming Spaces & Rights in the City
- **Workshop 1:** Open Publication

15.15

15.45
- **Parallel 2**
- **Book Launch 2:** Teknopolis & Kota Komunikatif
- **Workshop 2:** Investing Disaster Risk Reduction for Coastal Resilience (City)

18.30 **Gala Dinner**

WEDNESDAY
APRIL 4TH, 2018

09.00 **Opening**

09.30 **Keynote Speech 3**
National Urban Policy: Cities as Engine of Growth

10.00

10.15

10.30
- **Keynote Lecture 2:**
  New Urban Agenda: Problems and Their Potential Solutions
- **Meet 2:**
  Faculty Board Meeting of SAPPD ITB and CAUP Tongji University

11.30

11.45

12.45
- **Parallel 3**
- **Workshop 3:** Presentation of Studio's Results by ITB and SU Students
- **Workshop 4**: Financing to Implement the New Urban Agenda

14.15

14.45
- **Parallel 4**
- **Poster Presentation**
- **Workshop 5:** Smart City Innovation
- **Workshop 6**: Financing to Implement the New Urban Agenda

16.15 **JRCP Best Paper Award**

16.45 **Wrap-up and Closing Ceremony**

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The 1st ITB Centennial and 4th PlanoCosmo International Conference

3–5 April 2018, Bandung, Indonesia

Accepted papers received: 13 April 2018
Published online: 1 June 2018

Preface

Papers

Informal Urbanism and Inclusive Development

Urban and Land Housing Development

Infrastructure and Transportation System

Environmental Planning and Management

Regional Innovation and Smart City System

Rural Transformation and Small Town Planning

Sustainable dimension adaptation measure in green township assessment criteria

Sustainable dimension adaptation measure in green township assessment criteria

R Yaman[1,3], S Thadaniti[1], N Ahmad[2], F M Halil[3], N M Nasir[3],
[1] Environment, Development, and Sustainability, Graduate School, Chulalongkorn University, Bangkok, THAILAND.
[2] Kulliyah of Architecture & Environmental Design, IIUM, MALAYSIA.
[3] Faculty of Architecture Planning & Surveying, UiTM, MALAYSIA.

Corresponding author: rostamyaman1@yahoo.co.uk

Abstract. Urbanized areas are typically the most significant sources of environmental degradation, thus, an urban assessment criteria tools aiming at equally adapted sustainability dimensions need to be firmly embedded in benchmarking planning and design framework and upon occupancy. The need for integral systematic rating is recognized in order to evaluate the performance of sustainable neighborhood and to promote sustainable urban development. In this study, Green Building Index Township Assessment Criteria (GBI-TAC) will be measure on holistic sustainable dimension pillar (SDP) adaptation in order to assess and redefine the current sustainability assessment criteria for future sustainable neighborhood development (SND). The objective of the research is to find-out whether the current GBI-TAC and its variables fulfilled the holistic SDP adaptations towards sustainable neighborhood development in Malaysia. The stakeholder-inclusion approached is used in this research in order to gather professional's stakeholders' opinions regarding the SDP adaptations for sustainable neighborhood development. The data were analysed using IBM SPSS AMOS22 Structural Equation Modelling. The findings suggested an adaptation gap of SDP in current GBI-TAC even though all core-criteria supported SDP adaptation, hence lead to further review and refinement for future Neighborhood Assessment Criteria in Malaysia.

1. Introduction

The magnitude of sustainable development in the built environment sector, particularly in urban vicinities was established for quite a long time [1]. Urban development plays an important function in pursuing sustainability via socio-economic growth and technological innovation [2]. Sustainable development at urban level suggest a well-balanced and broader specific requirement of its inhabitant which include earnings equity, job opportunities, accommodation, basic amenities, public infrastructure, accessibility connectivity and also protection to the environment [3]. Sustainable environment can be achieved at different steps and level in the urban development from the inside out of the interiors and the buildings, neighborhood/township and cities. Neighborhood are the areas and systems of cities, made up by their own built environment, social context and financial dynamics [4]. Neighborhood are perimeter to a specifically-defined boundary, and a communal acquaintance exists between their occupants [5]. To enhance neighborhood/township sustainability, an understanding of its buildings, communal spaces, public infrastructure [6], the promotion of a managing principles [7], and collaboration amid its components is essential.

Sustainable evaluation criteria comprise of indicators acquired from literature review. Several analyses on evaluation indicators suggest the intent designations and characteristic [8][9], development means of a recent indicator categorizes [10][11][12][13][14], indicator significances threshold [13] and indicators framework [15]. Presently, due to the availability of many rating method approaches, it is rather challenging for stakeholders to actually assess which one has the most general application. Diverse sets of requirement, significances threshold, physical factors and locale guidelines renders distinction. Currently,

Designing urban rules from emergent patterns: co-evolving paths of informal and formal urban systems - the case of Portugal

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Designing urban rules from emergent patterns: co-evolving paths of informal and formal urban systems - the case of Portugal

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Abstract. In many societies, informality has been a relevant part of the construction of the urban fabric. This is valid along a city's history and in recent urbanization processes. In the past, informality was in the origin of many of urban planning. Very soon urban planning adopted, as one of their main missions malfunctions in cities. Therefore, the need of formalization became one of the main reasons on the emergence, the control of informal processes. As an answer to informal individual solutions, urban planning responded with standardized rules and the urge of creating spaces fitting into pre-established rules instead of rules fitting into spaces. Urban planning as a discipline has gradually changed its path. The contrast between urbanization promoted under formal urban planning and informal urbanization is only one sign of the mismatch between urban planning actions and informal urbanization dynamics.
Considering this tension between formal and informal dynamics, in some cases, planning rules and planning processes continue ignoring informal dynamics; in other cases, planning rules are designed to integrate informality "without losing its face" through "planning games" [1]; and a third and less explored way in which planning systems interact with informality and from that interaction learn how to improve (we consider it a process of enrichment) planning rules while they promote an upgrade of informal interventions [2]. This latter win-win situation in which both informal and formal systems benefit from their interaction is still rare: most of the time either only one side benefits or none benefit from the interaction. Nevertheless, there are signs that from this interaction co-dependent adaptation might occur with positive outcomes for the urban system – in which co-evolutionary dynamics can be traced.
We propose to look at the way building rules have been designed in Europe in a context considered successful in the sense of dealing of informality – the one of Portugal. The country experienced a wave of informality associated with illegal urbanization since the 1960's in the main urban areas. The process of interaction between informal and formal urban systems proved to be a success in statistic terms. Slum clearance reduced the existence of informal occupations to almost zero. Informal settlements involving land tenure have been dealt with in the last two decades with considerable positive impact in the urban fabric.
Based on this, with this paper we will evaluate how informal and formal systems are impacting each other and changing along the time the shape of building and of planning rules. For this we will look at the planning tools created to formalize informal settlements in the Lisbon Metropolitan Area from the last forty years to see how urban and building rules were adapted to respond to the specific needs of informal settlements; how this adaptation moved from temporary and exceptional to permanent rules; finally, how were these new rules able to "contaminate" the general planning and building codes. We aim that these findings would help us to contribute to a "healthier" relation between formal and informal urban systems, not ignoring each other, not controlling each other but instead learning with each other. By achieving this, planning systems become more responsive; on the other hand, informal occupations can be upgraded without being destroyed with the contribution of the planning systems.

The Role of Community-Based Organization in Disaster Response at Mt. Sinabung

The Role of Community-Based Organization in Disaster Response at Mt. Sinabung

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Abstract. In August 2010, Mt. Sinabung in North Sumatera erupted for the very first time in 400 years; until that moment the volcano had been declared as dormant. In contrast to the communities living around Mt. Merapi in Java, the Mt. Sinabung communities had little to no preparation when faced with the sudden volcanic eruption. The Sinabung eruption caused disturbances as it ruined the farmlands and community's sources of livelihood, especially since most of the community members are farmers. Most of the time, these farmlands are located not far from their house, so displacing them means moving them away from their main source of income. This makes some of the displaced keep moving back to their old villages to farm even though they are putting themselves in danger by doing so. This condition motivated the community to initiate Beidar, an organization to monitor volcanic activities and give out early warnings to villagers nearby and within the hazard zone to evacuate. This paper will study Beidar's involvement with the community and the government, how they operate, and how they impact the community members living near the volcano. This data used in this study are primarily from interviews with Beidar members and organizers, volcanic monitoring posts, and the local disaster management. A thematic analysis of the interviews shows the history of Beidar's development as an organization proudly independent of the government; the "recruitment" of members; the important roles in the community including mediating between government and other local organizations (e.g., volcano monitoring station); specific monitoring; communication and evacuation activities (e.g., including search activities after eruptions and lahars); contacts and sharing of experience with similar groups in Indonesia; and identifying the limits of their influence in preventing local people from returning to the red zone. This research concludes that Beidar was officially acknowledged as an organization in March 2014 under the wing of the Volcanology Agency, which needed help to disseminate the volcano status information to the community. Recruiting local youth is seen as a better alternative since the communities — especially the internally displaced community members — have little trust in the government due to the crisis and deemed them 'incompetent'. Beidar, as a community-based organization, can fill the gap between the community and the government in terms of information dissemination, especially because they are local and are acknowledged as a trusted part of the community. However, this dynamic has a side effect of the villagers' feeling of security with Beidar 'watching over them'. This lowers their risk perception of the volcano, leading them to endanger themselves more by crossing over the hazard area to conducting their day-to-day activity.

1. Introduction

While Indonesia has experienced many disasters, the level of disaster preparedness varies across the country. In some places where experience with disasters is limited, the preparedness can be very low. Experience with disasters may lead to two types of responses. First, people are more aware and eventually build their capacity to deal with the disaster. Second, ignorance can increase when the impacts of disasters are considered small. Therefore, according to Lindell and Whitney, disaster experience is a good predictor

Crowdsourced Smart Cities versus Corporate Smart Cities

Crowdsourced Smart Cities versus Corporate Smart Cities

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Abstract. Considering the speedy growth of smart-city promises and practices, there is an urgent need to take a critical approach and offer an integrated vision for an otherwise fragmented and sectoral concept. In particular, the literature warns about a critical deficit around the theorization of the smart city because discussions of relevant smart city theories or frameworks are few and fall short of offering alternative practical resolutions to the dominant discourse. In developing a response to such a deficit, this paper takes up the challenge to broaden theoretical insights into smart cities, by offering a bottom-up understanding of the 'smart city' concept with special attention to the potential of passive crowdsourcing based on the ocean of mostly untapped and unutilized available data in the public domain. Crowdsourced smart cities are proposed as an alternative to enable public engagement in smart city debates and decision-making – especially when dealing with global digital corporations.

1. Introduction

The concept of the smart city has emerged at the intersection of debates on the future of urban places, new technologies, and infrastructures – as a solution to offer clean, livable, technologically advanced, economically robust cities [1, 2]. The popularity of the concept is based on a mix of various factors, including the availability of substantial public financial resources (such as the EU Strategic Energy Technology Plan) to fund smart city initiatives; the tendency of global corporations (such as Cisco, Google and IBM) to heavily invest in urban digitization projects [3, 4]; and, finally, a growing range of complex urban challenges that need advanced technology-enabled solutions [5-7].

Nevertheless, the literature warns about the lack of both theoretical insights and empirical evidence required to fully understand the opportunities, challenges, and implications of smart cities. Research in this field is in its infancy [1, 4], fragmented along disciplinary lines [8, 9] and based on limited city case studies [6, 10].

Given the fast growing global attention given to smart cities and significant practical implications in the form of smart city initiatives and projects, there is an urgent need to take a critical approach and offer an integrated vision for this otherwise fragmented and sectoral concept [1, 2]. Here, the danger is that urban visioning is increasingly reduced to a single technology-centric vision that is simplistic and does not account for the socio-economic and spatial complexity of cities [3, 11, 12].

The literature specifically puts an emphasis on the critical deficit around theorization of the smart city [1, 12, 13]. Discussions of relevant smart city theories or frameworks are few; analyses lag behind actual practice and then fall short of offering alternative practical resolutions to the dominant discourse.

In developing a response to this deficit, this paper takes up the challenge of broadening theoretical insights into smart cities by offering a bottom-up understanding of the concept. Firstly, it examines how the smart city is currently defined in the literature and points out different – and sometimes contradictory – approaches taken towards smart city practice around the world. Secondly, it focuses on the definition and evolution of crowdsourcing during its relatively short existence. Thirdly, it brings the two earlier parts together by proposing the 'crowdsourced smart city' as an alternative theoretical perspective that has practical means of enabling people's voices to be heard in smart city decision-making and evaluation processes. This alternative theoretical perspective also has the capacity to empower informed

Rural Industry Clustering Towards Transitional Rural-Urban Interface

by Prihadi Nugroho

IOP Conference Series: Earth and Environmental Science

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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,

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.

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).

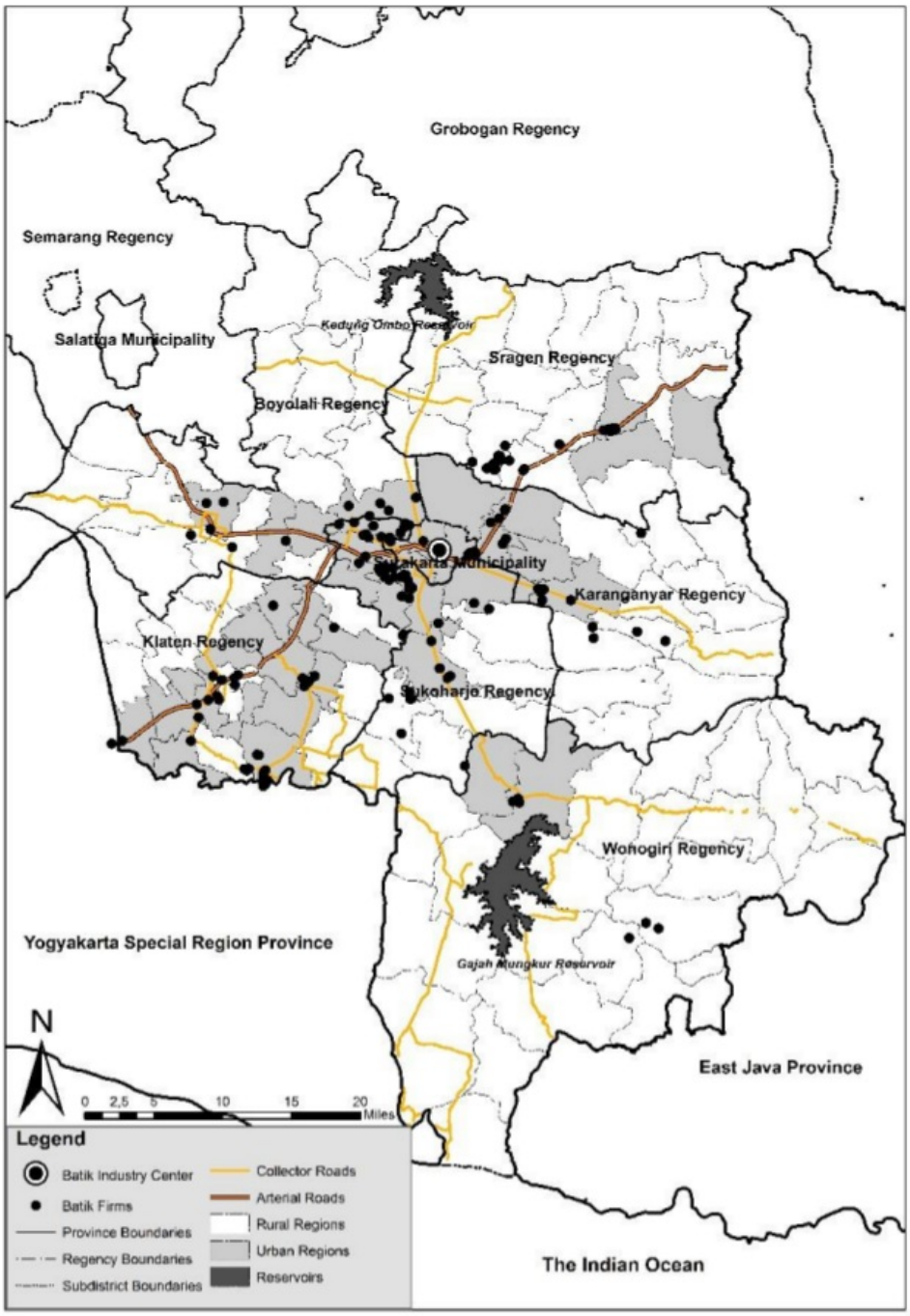

Figure 1. Spatial distribution pattern of batik firms in greater Solo region

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.

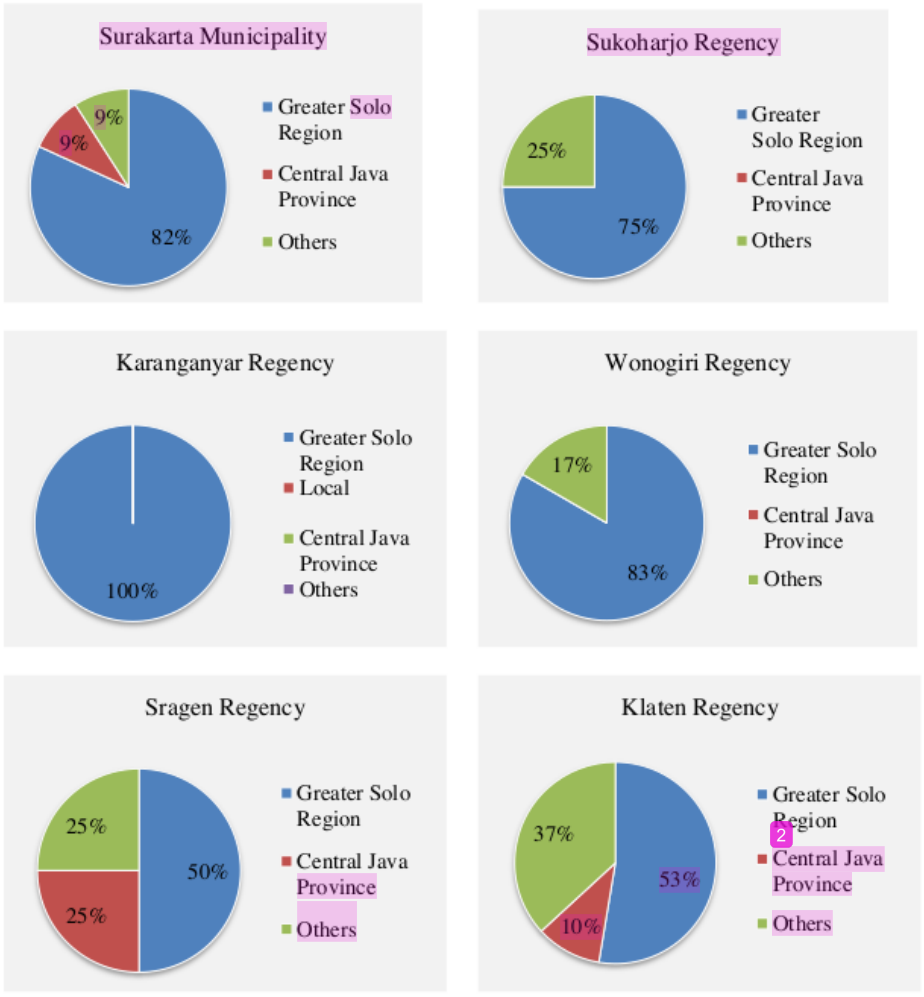

Figure 2. Input linkages pattern

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.

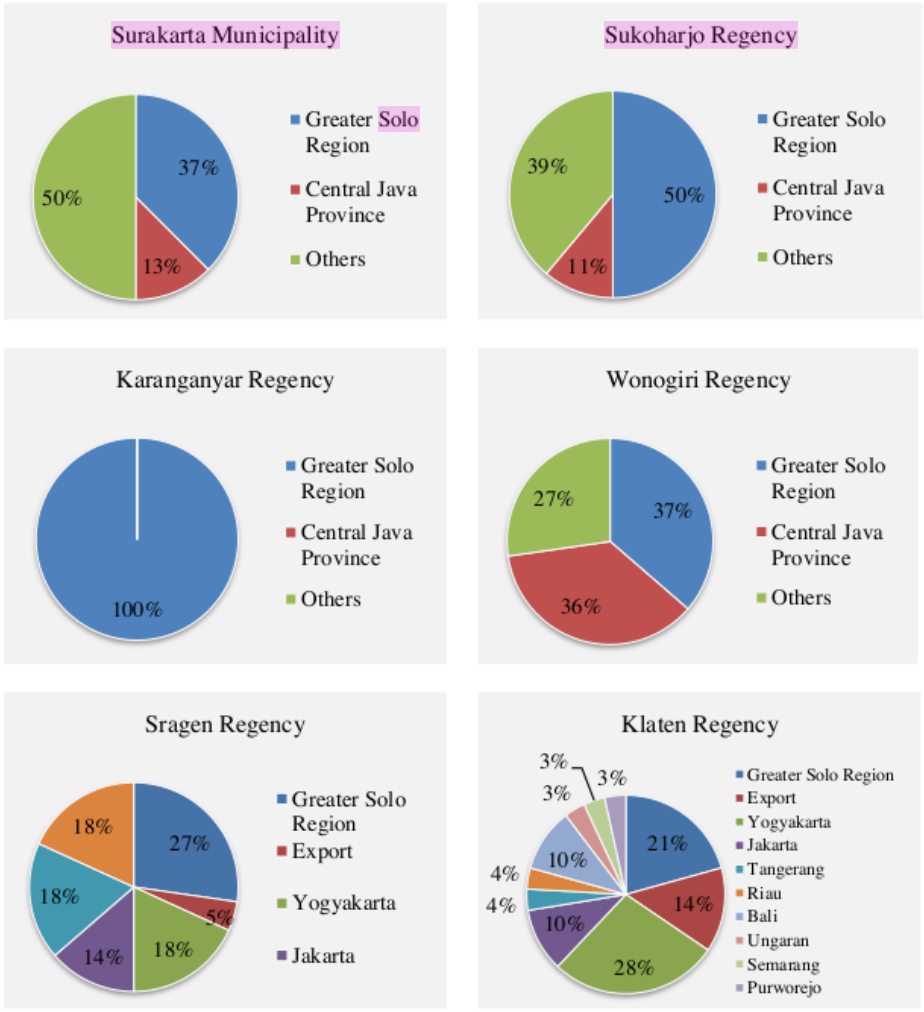

Figure 3. Output linkages pattern

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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