

Knowledge Integration and Spatial Context: A Pathway to an Education and Innovation Hub for Betong as a Model City of Sustainable Self-Reliance

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Abstract

This research article aims to present a synthesis and analysis of the knowledge landscape concerning the development of Betong District, Yala Province, as a model city. The study seeks to support the initiative to establish an Education, Research, and Service Innovation Center for the security, prosperity, and sustainability of a model city within the southern border economic triangle. This research employs a descriptive analytical methodology through the synthesis of research and project implementation outcomes in Betong District over a five-year period (2016–2020). The findings reveal that the knowledge landscape is categorized into five main areas: (1) tourism, (2) product development, (3) commerce and business, (4) drug-related problems, and (5) environmental management. These bodies of knowledge are interconnected with the core conceptual frameworks for model city development, namely the Sufficiency Economy Philosophy, the principle of participation, and the principle of community development for sustainable self-reliance. The study also identifies knowledge gaps that require further exploration across multiple dimensions to ensure comprehensive and tangible development. Consequently, this article proposes the establishment of an integrated Education, Research, and Service Innovation Center. This center should function as a knowledge hub, a repository for the historical background of the Malay Peninsula border region, and a comprehensive community management center to drive Betong District toward becoming a sustainably self-reliant model city.

Introduction

The southern border provinces of Thailand are areas of high potential in terms of economy, society, and tourism, yet they face multiple challenges in both security and sustainable development

dimensions. Consequently, the Thai government, in a Cabinet resolution on October 4, 2016, approved in principle the "Secure, Prosperous, and Sustainable Triangle" Model City Project (2017–2020). This initiative aimed to develop three districts in the

southern border provinces into special economic areas. Betong District, Yala Province, was designated as a "model city for sustainable self-reliant development" under this framework (Isranews Agency, 2016).

Driving Betong District towards becoming a sustainably self-reliant model city necessitates comprehensive, interconnected, and contextually relevant data and knowledge. Over the past five years (2016–2020), numerous research studies and development projects have been conducted in Betong, generating a vast yet dispersed and multi-dimensional body of knowledge. This situation creates an urgent need to systematically explore, analyze, and synthesize the "knowledge landscape" pertaining to Betong's model city development. Such an effort is crucial to obtain an overview, map the interconnections, and identify gaps in the existing knowledge base.

Therefore, this research article has three primary objectives: (1) to systematically compile and organize the knowledge on Betong's model city development through a synthesis of relevant research and development projects in the area; (2) to analyze the linkages between academic knowledge and the context of sustainable self-reliant model city development; and (3) to present the research findings as a guiding framework to support the establishment of an Education, Research, and Service Innovation Center. This center is intended to enhance the security, prosperity, and sustainability of the model city within the southern border economic triangle. It is hoped that this article will serve as a significant contribution to laying both the academic and practical foundations for the genuine and sustainable development of Betong District.

Conceptual Framework and Literature Reviews

1. Concepts of Prototype City Development

The concept of prototype city development, particularly within the context of special develop-

ment zones, aims to create a development model that can be replicated or adapted in other areas. This concept is linked to the global trends of Smart City and Innovation City development. However, such concepts often primarily emphasize physical infrastructure and technology (Hollands, 2008). In contrast, the context of Betong City, with its unique social, cultural, and historical characteristics, necessitates a development framework that prioritizes community dimensions and self-reliance over technology-centric development.

A critical review of the literature reveals that prototype city development concepts can be categorized into two main streams, which differ significantly in philosophy and methodology:

Stream 1: Top-Down Development Approach

This stream is influenced by Rational Planning Theory and Linear Economic Development Theory, which view urban development as dependent on large-scale government investment in infrastructure, technology transfer, and attracting external investment (Porter, 1990). The advantage of this approach lies in its speed and clear direction. However, a significant limitation is the frequent lack of local community participation, leading to sustainability issues post-project completion or misalignment with the local socio-cultural context (Scott, 1998).

Stream 2: Bottom-Up Development Approach

This stream is influenced by Community Development Theory and the Community Economy concept, emphasizing development rooted in local resources, indigenous knowledge, and community needs as primary drivers (Kretzmann & McKnight, 1993). This approach prioritizes participation, community capacity building, and sustainable development based on social and cultural capital. Its limitations include potentially lengthy timelines, a lack of connection to the external economic system, and possible inadequacy in responding to rapid structural changes.

Critical Comparison and the Researcher's Theoretical Position

Given the case study of Betong City, a southern border area characterized by complexity in security, economic, and social dimensions, developing a prototype city under the "Stable, Prosperous, Sustainable Triangle" project necessitates a careful consideration of the strengths and limitations of the two aforementioned approaches. The researcher adopts a theoretical position supporting a Hybrid Development Approach. This approach synthesizes top-down and bottom-up methodologies, grounded in three key principles relevant to the Betong context:

The Philosophy of Sufficiency Economy: This conceptual framework emphasizes moderation, reasonableness, and the need for self-immunity (Pujinda & Boonsom, 2016). It prioritizes development appropriate to the specific context and the community's readiness, contrasting with capitalist development paradigms focused primarily on quantitative growth (Puntasen, 2008).

The Participation Principle: Influenced by Participatory Democracy Theory and Sustainable Development concepts, this principle emphasizes participatory processes involving all sectors of the populace (Pretty, 1995). This principle differs significantly from centralized development approaches that fail to provide communities with a voice in decision-making.

Community Development for Sustainable Self-Reliance: This concept focuses on holistic development, integrating economic, social, cultural, and environmental dimensions, while leveraging social capital and local resources as foundational elements (Chambers, 1997). This concept contrasts with development approaches dependent on government or external capital, which may lead to long-term instability.

This theoretical positioning reflects the researcher's view that prototype city development is not merely about constructing infrastructure or

attracting investment but is a process of social transformation centered on the community, achieved through a balanced integration of government policy and community-driven initiatives.

2. Case Study: Center for Educational and Research Development

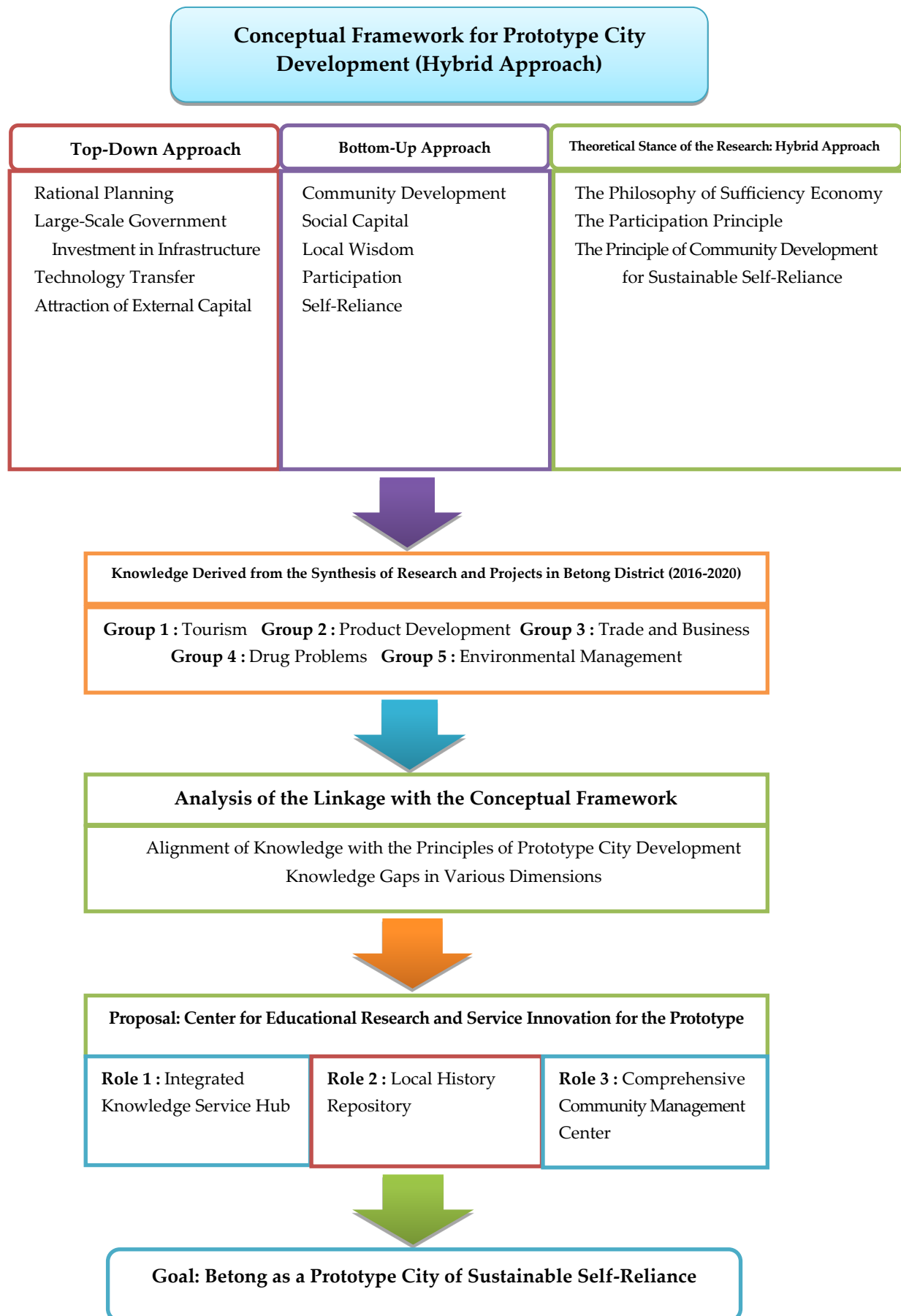
Models for centers of education, research, and innovation aimed at supporting area-based development can be observed in significant examples such as the Royal Development Study Centers. These were initiated by His Majesty King Bhumibol Adulyadej The Great in various regions, functioning as "living laboratories" for studying, experimenting, and researching suitable development approaches tailored to different geographical conditions (Office of the Royal Development Projects Board, n.d.).

However, contemporary prototype city development requires consideration of newer innovation center concepts developed internationally. These include the Living Lab concept, which emphasizes user participation in developing and testing innovations within real-world contexts (Bergvall-Kåreborn & Ståhlbröst, 2009), and the Triple Helix concept, which highlights the collaboration between government, academia, and industry in driving innovation (Etzkowitz & Leydesdorff, 2000). These concepts differ from the Royal Development Study Centers in their emphasis on proactive user participation and the establishment of diverse collaborative networks.

For the specific context of Betong City, the Center for Educational Research and Innovation proposed in this research adopts a hybrid character, integrating elements of the Living Lab and Triple Helix concepts while adapting them to the local context. This center focuses on three key roles: (1) serving as an Integrated Knowledge Service Hub; (2) functioning as a Repository and Resource Center for Local History; and (3) acting as a Comprehensive Community Management Center.

Figure 1

Conceptual Framework Diagram



The conceptual framework diagram above illustrates the researcher's theoretical position, which is grounded in a Hybrid Approach that integrates top-down and bottom-up development paradigms. This position is underpinned by three key principles: the Philosophy of Sufficiency Economy, the Participation Principle, and the Principle of Community Development for Sustainable Self-Reliance. Knowledge derived from the synthesis of research and projects in Betong District between 2016 and 2020 was categorized into five main areas: Tourism, Product Development, Trade and Business, Drug Problems, and Environmental Management. This led to an analysis of the linkages between these five bodies of knowledge and the core conceptual framework of prototype city development, aimed at assessing alignment and identifying knowledge gaps. The findings from this analysis informed the proposal to establish a Center for Educational Research and Service Innovation, which serves three key roles: functioning as an Integrated Knowledge Service Hub, a Local History Repository, and a Comprehensive Community Management Center. Collectively, these components are directed toward the ultimate goal of developing Betong into a Prototype City of Sustainable Self-Reliance.

3. Research Synthesis

As this study involves synthesizing knowledge from existing research and projects, it relies on the methodology of Research Synthesis. This refers to the process of drawing integrative conclusions from multiple studies that have investigated the same issue but were conducted in different contexts or using different methods (Yunrat, 2018). Research synthesis can be categorized into two main types: Qualitative Research Synthesis, which analyzes and summarizes content from research reports, and Quantitative Research Synthesis (Meta-Analysis), which employs statistical analysis of numerical data (Chitkesorn & Layraman, 2020). For this study, a

qualitative synthesis approach will be employed, utilizing content analysis to categorize and summarize knowledge from research and development projects related to Betong District.

Research Methods

This study employs a qualitative research design with a descriptive purpose, utilizing a systematic research synthesis methodology to integrate findings from multiple studies and development projects conducted in Betong District. The research procedure consists of the following steps:

1. Research Design

This study adopts a qualitative descriptive research design (Sandelowski, 2000) combined with systematic research synthesis (Cooper, 2017). The qualitative descriptive design is appropriate for studies aiming to provide a comprehensive summary of events, phenomena, or knowledge landscapes in everyday language, remaining close to the data without imposing highly interpretive theoretical frameworks (Sandelowski, 2000). This design aligns with the study's objective to synthesize and categorize existing knowledge from research and development projects related to Betong's model city development.

The research design incorporates elements of systematic review methodology (Higgins et al., 2019) adapted for qualitative synthesis, which involves systematic searching, screening, appraisal, and synthesis of relevant literature. This approach enables the researcher to identify patterns, themes, and gaps across multiple studies, providing a holistic understanding of the knowledge landscape in the area of study.

2. Unit of Analysis

The unit of analysis in this study is defined as individual research reports and development project documents that contain empirical findings, methodological descriptions, and policy implications related to Betong District's development. Specifically, the unit of analysis encompasses:

1. **Research reports:** Completed academic research studies, including theses, dissertations, and funded research projects, that present primary data collected in Betong District.

2. **Development project documents:** Official reports, policy briefs, and project evaluation documents related to the "Secure, Prosperous, and Sustainable Triangle" model city initiative implemented in Betong District.

Each document was treated as an independent unit of analysis, with data extracted systematically using a standardized recording form. This approach aligns with the methodological recommendations for research synthesis, where individual studies serve as the primary units from which data are extracted and aggregated (Cooper, 2017).

3. Population and Sample Selection

3.1 Population

The study population consists of two categories of documents:

1. **Research documents:** Research reports, theses, dissertations, and academic articles focusing on various dimensions of Betong District, funded by government agencies such as the National Research Council of Thailand (NRCT), the Office of the Permanent Secretary of the Ministry of Higher Education, Science, Research and Innovation (MHESI), and the Thailand Research Fund (TRF), conducted during the period 2016–2020.

2. **Policy and project documents:** Policy documents, project proposals, and development project reports related to the "Secure, Prosperous, and Sustainable Triangle" model city initiative within Betong District during the same timeframe.

3.2 Sample Selection Criteria

The sample was selected using **purposive sampling** (Patton, 2015), which is appropriate for research synthesis as it ensures that included documents are information-rich and relevant to the research questions. The inclusion criteria were:

1. **Relevance:** Documents must address one or more dimensions of Betong District's development in relation to the model city framework.

2. **Methodological credibility:** Research studies must employ systematic data collection and analysis methods, with clear descriptions of research procedures.

3. **Accessibility:** Documents must be complete and accessible from verified academic databases or institutional repositories.

4. **Timeframe:** Documents must have been produced or published between 2016 and 2020, corresponding to the implementation period of the model city initiative.

The final sample consisted of **11 research studies** and **6 development projects**, selected after screening 38 potential documents against the inclusion criteria. The sample size aligns with recommendations for qualitative research synthesis, which emphasize depth of analysis over quantity of studies (Sandelowski & Barroso, 2007).

4. Data Collection Procedure

The data collection process involved four systematic steps:

Step 1: Document Retrieval

Documents were retrieved from the following verified databases and repositories:

- National Research Council of Thailand (NRCT) research database
- Ministry of Higher Education, Science, Research and Innovation (MHESI) e-Library
- ThaiLIS (Thai Library Integrated System) digital thesis repository
- Yala Rajabhat University institutional repository
- Official government project archives

Step 2: Document Screening and Eligibility

Assessment

Retrieved documents were screened using a **three-stage eligibility assessment** (Moher et al., 2009):

1. Title and abstract screening: Documents were excluded if titles and abstracts did not mention Betong District or model city development.

2. Full-text review: Remaining documents were reviewed in full to assess alignment with inclusion criteria.

3. Quality appraisal: Included research studies were assessed for methodological quality using adapted criteria from the Critical Appraisal Skills Programme, including clarity of research objectives, appropriateness of methodology, and rigor of data analysis.

Step 3: Instrument Development

A **standardized data recording form** was developed to ensure consistent data extraction across documents. The form was designed based on guidelines for research synthesis data extraction (Cooper, 2017) and comprised three main sections:

1. Document identification: Title, author(s), year, type (research/project), funding source, and database source.

2. Methodological characteristics: Research objectives, research design, data collection methods, sample description, and analytical approaches.

3. Findings and implications: Key findings, knowledge domain, participatory processes, practical applications, and alignment with model city principles.

The instrument underwent content **validity verification** by a panel of three experts from diverse fields: (1) research methodology, (2) community development, and (3) public policy. Experts rated each item on a 4-point scale (1 = not relevant to 4 = highly relevant). The **Item-Objective Congruence (IOC)** index was calculated, with items achieving $\text{IOC} \geq 0.50$ retained (Rovinelli & Hambleton, 1977). All items met this threshold.

Step 4: Data Extraction

Data extraction was conducted by two independent coders who were trained in the use of the recording form. Any discrepancies between coders were resolved through discussion and consensus, with a third researcher consulted

when agreement could not be reached. This **dual-coder** approach enhances the reliability of data extraction (Belur et al., 2021).

5. Data Analysis and Synthesis

Data analysis employed **thematic content analysis** following the systematic approach described by Cooper (2017) and further elaborated by Braun and Clarke (2006) for thematic analysis. The analysis proceeded through six phases:

Phase 1: Familiarization with the Data

The researcher read and re-read all extracted data to develop a deep understanding of the content. This phase involved taking initial notes and documenting emerging patterns across documents.

Phase 2: Generating Initial Codes

Data were coded systematically using inductive coding (Thomas, 2006), where codes emerged directly from the data rather than being imposed by pre-existing frameworks. NVivo 12 qualitative data analysis software was used to manage the coding process. Examples of codes generated included: "tourism management strategies," "participatory action research," "community-based product development," "drug prevention approaches," and "environmental planning."

Phase 3: Searching for Themes

Codes were grouped into potential themes based on conceptual similarity. This phase involved reviewing coded data and identifying broader patterns of meaning. Initial themes were organized into five knowledge domains that emerged from the data: (1) tourism, (2) product development, (3) commerce and business, (4) drug-related problems, and (5) environmental management.

Phase 4: Reviewing Themes

Themes were reviewed to ensure they accurately represented the coded data and addressed the research questions. This phase involved:

- Checking that each theme had sufficient supporting data
- Examining relationships between themes
- Refining theme boundaries to avoid overlap

Phase 5: Defining and Naming Themes

Each theme was clearly defined with a concise name and detailed description. The definitions specified the scope of each theme and its relevance to model city development.

Phase 6: Producing the Synthesis

The final synthesis involved developing narrative descriptions of each knowledge domain and analyzing their alignment with the three core conceptual principles: (1) Sufficiency Economy Philosophy, (2) Participation Principle, and (3) Community Development for Sustainable Self-Reliance. The synthesis also involved identifying knowledge gaps across strategic themes.

6. Reliability and Validity Measures

To ensure the trustworthiness of the findings, this study employed strategies aligned with the criteria for qualitative research rigor established by Lincoln and Guba (1985) and further elaborated by Korstjens and Moser (2018):

6.1 Credibility (Internal Validity)

Triangulation: Multiple data sources (11 research studies and 6 development projects) were used to corroborate findings. This source triangulation (Patton, 2015) enabled cross-validation of knowledge domains across different document types.

Peer Debriefing: Regular discussions were held with two colleagues experienced in research synthesis and community development. These debriefing sessions provided opportunities to test emerging interpretations and challenge assumptions.

Member Checking: Preliminary findings were presented to five stakeholders involved in Betong District development (including local government officers and community leaders) to verify the accuracy and relevance of the synthesized knowledge. Feedback was incorporated into the final analysis.

6.2 Transferability (External Validity)

Thick Description: Detailed descriptions of the research context, including the unique characteristics of Betong District, the model city framework, and the specific characteristics of included studies, were provided to enable readers to assess the applicability of findings to other contexts (Lincoln & Guba, 1985).

Purposive Sampling: Documents were selected systematically based on clear inclusion criteria, ensuring that the sample was representative of the relevant knowledge base.

6.3 Dependability (Reliability)

Audit Trail: A comprehensive record was maintained documenting all research decisions, including:

- Search strategies and databases accessed
- Screening decisions and reasons for inclusion/exclusion
- Coding framework development and modifications
- Analysis procedures and interpretive decisions

This audit trail enables external reviewers to follow the research process and assess the consistency of procedures (Korstjens & Moser, 2018).

Inter-coder Agreement: Data extraction was conducted by two independent coders. Inter-coder reliability was calculated using Cohen's Kappa (Cohen, 1960) on a subset of 5 documents (30% of the sample). The Kappa coefficient for coding of knowledge domains was 0.87, indicating "almost perfect agreement" (Landis & Koch, 1977). Discrepancies were resolved through consensus discussion.

6.4 Confirmability (Objectivity)

Reflexivity: The researcher maintained a reflexive journal throughout the research process, documenting personal assumptions, biases, and methodological decisions. This practice helps distinguish between participant perspectives and researcher interpretations (Finlay, 2002).

Researcher Position Statement: The researcher's background as an academic affiliated with an institution in the southern border region and involvement in regional development initiatives was acknowledged. This transparency allows readers to consider how the researcher's perspective may have influenced the analysis.

7. Ethical Considerations

Although this study involved document analysis rather than direct human participants, ethical considerations were addressed through:

1. Proper citation: All source documents were cited appropriately to acknowledge original authors.

2. Data integrity: Extracted data were maintained in secure files and used only for the stated research purposes.

3. Transparency: The use of AI tools (ChatGPT) as supportive aids for language refinement and content organization was disclosed, following guidelines for responsible AI use in research (Nature, 2023). All AI-generated suggestions were critically reviewed and verified by the researcher.

Results and Discussion

Results

1. Knowledge Landscape from Research and Development Projects in Betong District

The synthesis of 11 research studies conducted between 2016 and 2020 allows for the summary of knowledge related to Betong's model city development into five domains, as presented in Table 1.

Table 1

Status and Trends of Knowledge from Research and Development Projects in Betong District (2016–2020)

No.	Research / Development Project Title (Year)	Knowledge Domain	Project Type
1	Approaches for Tourism Business Management of the Betong Temperate Zone Flower Production Group in Yala Province (Damrongkadee, 2015)	Tourism	Research
2	Factors Affecting Thai's Tourists Satisfaction on Ecotourism in Betong District, Yala. (Sawaaan, et al., 2016)	Tourism	Research
3	The external environment and the Border Trade Entrepreneurs' Expectations: A case study of Betong, Yala. (Waepa, 2017)	Commerce	Research
4	The participatory actionresearch for the development of Kopi manufacturer (ancient coffee), Betong District, Yala Province. (Rungrut, et al., 2018)	Commerce, Product Development	Research
5	Betong: strategies of the tourism communication under the violence crisis in the three southern border provinces. (Kaewngam, 2018)	Tourism	Research
6	Development of tea product from Betong Watercress. (Tayeh, 2018)	Product Development	Research
7	Development Strategy the City of Betong for Sustainable Tourism. (Jussapalo, et al., 2018)	Tourism	Research
8	Behaviours of Malaysian tourists and potentials of ecotourism in Betong District, Yala Province. (Visessung, 2019)	Tourism	Research
9	A Study of Community Leaders Opinion on Drug Problems: A Case Study of Yarom Subdistrict, Betong District, Yala Province. (Anusornprasert & Chinfuk, 2019)	Drug-related Problems	Research
10	Environmental management for accommodating the growth of Betong municipality. (Leelakriangkrai, et al., 2019)	Environmental Management	Research
11	The driving for community-based tourism research in 3 Southern Border Provinces: Betong District, Yala Province. (Tungseng, et al., 2020)	Tourism, Product Development	Research

As shown in Table 1, the domain of tourism has the highest number of research studies (6 projects) and has been supported by several development initiatives, reflecting its status as a primary strategic focus for the area. This is followed by knowledge in product development and commerce, which frequently appear interconnected (e.g., the traditional coffee project). In contrast, knowledge domains concerning drug-related problems and environmental management are relatively understudied (only 1 project each). Some research addresses more than one knowledge domain, highlighting the interconnected nature of the issues in the area.

2. Alignment of Knowledge with Principles for Self-Reliant Model City Development

The synthesized knowledge from the research on Betong District was analyzed to reveal its

alignment with the context of developing Betong into a sustainable self-reliant model city. The input factor was defined as the thematic knowledge domain from each study, with consideration given to research processes that emphasized stakeholder involvement. This was synthesized with the core principles of the model city framework: 1. The Sufficiency Economy Philosophy, 2. The Participation Principle, and 3. The Principle of Community Development for Sustainable Self-Reliance. Codes were assigned to these principles for analysis as follows:

Code SP1: Sufficiency Economy Philosophy

Code SP2: Participation Principle

Code SP3: Community Development for Sustainable Self-Reliance

Table 2

Alignment of Research-based Knowledge with the Context of Developing Betong as a Sustainable Self-Reliant Model City

	Research Project	Knowledge Domain	Participatory Process in Research	Alignment with Model City Principles		
				SP1	SP2	SP3
1	Approaches for Tourism Business Management of the Betong Temperate Zone Flower Production Group in Yala Province (Damrongkadee, 2015)	Tourism	✓	✓	✓	✓
2	Factors Affecting Thai's Tourists Satisfaction on	Tourism	✓		✓	
3	The external environment and the Border Trade Entrepreneurs' Expectations: A case study of Betong, Yala. (Waepa, 2017)	Commerce	✓		✓	
4	The participatory actionresearch for the development of Kopi manufacturer (ancient coffee), Betong District, Yala Province. (Rungrut, et al., 2018)	Commerce, Product Development	✓		✓	
5	Betong: strategies of the tourism communication under the violence crisis in the three southern border provinces. (Kaewngam, 2018)	Tourism	✓	✓	✓	✓
6	Development of tea product from Betong Watercress. (Tayeh, 2018)	Product Development	✓		✓	
7	Development Strategy the City of Betong for Sustainable Tourism. (Jussapalo, et al., 2018)	Tourism	✓		✓	
8	Behaviours of Malaysian tourists and potentials of ecotourism in Betong District, Yala Province. (Visessung, 2019)	Tourism	✓	✓	✓	✓

	Research Project	Knowledge Domain	Participatory Process in Research	Alignment with Model City Principles		
				SP1	SP2	SP3
9	A Study of Community Leaders Opinion on Drug Problems: A Case Study of Yarom Subdistrict, Betong District, Yala Province. (Anusornprasert & Chinfuk, 2019)	Drug-related Problems	✓	✓	✓	✓
10	Environmental management for accommodating the growth of Betong municipality. (Leelakriangkrai, et al., 2019)	Environmental Management	✓	✓	✓	✓
11	The driving for community-based tourism research in 3 Southern Border Provinces: Betong District, Yala Province. (Tungseng, et al., 2020)	Tourism, Product Development	✓	✓	✓	✓

When linking all five knowledge domains to the three core conceptual principles of the self-reliant model city, several findings emerge. The Sufficiency Economy Philosophy (SP1), while not explicitly stated as a core principle in every study, can be connected to research focused on generating supplemental income from local resources, promoting nature conservation, and developing contextually appropriate businesses. The Participation Principle (SP2) is clearly evident in almost all research, particularly in Participatory Action Research (PAR) projects that actively involve the community in the research process, such as studies on developing the traditional Kopi coffee producer group and the community-based tourism research plan. The Principle of Community Development for Sustainable Self-Reliance (SP3) aligns with various knowledge domains, especially research related to local product development, community-based tourism management, and economic network building. Every knowledge domain connects with at least one model city principle, with the domains of tourism and product development showing particularly strong alignment with all three principles.

3. Examination of Knowledge Alignment with Betong's Model City Development Directions

When examining the five identified knowledge domains in relation to Betong District's model city development directions (comprising 3 strategic themes and 22 strategies), the analysis reveals the following:

The existing body of knowledge covers all three strategic themes: (1) Enhancing Quality of Life and Sustainable Economy, (2) Accelerating Infrastructure Development, and (3) Developing Management Mechanisms.

The knowledge is distributed across various strategies, with a predominant focus on Strategic Theme 1. It aligns most closely with strategies such as promoting conservation-based tourism (S7), supporting local food businesses (S11), and establishing agricultural networks (S6). Meanwhile, Strategic Theme 2 is primarily addressed through large-scale development projects, such as those focusing on public utilities and tourism site development.

This examination identifies several critical knowledge gaps:

In Tourism: There is a lack of in-depth studies on historical tourism and detailed databases profiling specific types of tourist attractions.

In Product Development: Significant potential remains for research and design initiatives aimed at creating a distinct commercial identity from Betong's unique natural and cultural resources.

In Management: A gap exists in integrative knowledge concerning holistic community management systems. This includes comprehensive frameworks for managing community capital, human resources, and environmental assets, which is central to achieving Strategic Theme 3.

Discussion

Structural and Theoretical Discussion

3.1 Interpreting the Knowledge Landscape within the Context of Power Structures and Knowledge Production

The first key finding of this study is the imbalance of knowledge between domains related to the economy (Tourism, Product Development, Trade) and those related to society and the environment (Drug Problems, Environmental Management). This imbalance can be explained through the concept of the Political Economy of Knowledge, which suggests that the production of academic knowledge is shaped by the interests and priorities of funding sources (Mirowski & Sent, 2008).

In the case of Betong District, the fact that tourism received the highest level of attention aligns with the government's Southern Border Economic Development Policy, which prioritizes tourism promotion as a primary mechanism for generating income and ensuring stability in the region (Office of the National Security Council, 2017). This corresponds with Harvey's (2005) observation that development under capitalism often emphasizes the creation of economic value through the commodification of place over development in other dimensions.

However, the neglect of knowledge concerning drug problems and environmental management may lead to long-term consequences that threaten the sustainability of prototype city development. This is evident in case studies of various tourist cities that have experienced natural resource degradation and social problems resulting from unbalanced growth (Gössling et al., 2012; Dodds & Butler, 2019).

3.2 Interpreting the Linkages between Knowledge and the Theoretical Framework of Hybrid Development

The researcher's theoretical position advocating a Hybrid Development Approach is supported by the finding that knowledge within the area does not conform exclusively to either top-down or bottom-up paradigms but rather represents a synthesis of both.

Regarding the top-down approach, it was found that the formulation of prototype city development strategies from national policies played a significant role in shaping research directions and frameworks, particularly in the dimensions of tourism and infrastructure development. This aligns with the concept of centralized strategic planning, which views the state as playing a crucial role in determining development directions (Scott, 1998).

Regarding the bottom-up approach, it was found that participatory action research processes and community-based product development reflected community agency and social capital, which played significant roles in shaping development patterns (Putnam, 2000).

A key challenge lies in concretely linking these two approaches. The finding that community participation in research remained largely at the level of consultation or implementation as prescribed (Arnstein, 1969) reflects that the power gap between the state and the community remains a significant obstacle to genuinely participatory development.

3.3 Interpreting the Proposal for a Center for Educational Research and Innovation through the Lens of Structuration Theory

The proposal to establish a Center for Educational Research and Service Innovation can be interpreted through Giddens's (1984) Structuration Theory, which explains that the relationship between social structure and human agency is characterized by the duality of structure—a mutual shaping influence.

The proposed Center serves as a structural-agency nexus in three dimensions:

1. Structural Dimension: The Center functions as a mechanism for systematizing knowledge, creating databases, and establishing development guidelines consistent with national policies. These represent structural elements that help define operational frameworks.

2. Agency Dimension: The Center serves as a space where communities, researchers, and various sectors can participate in defining research agendas, experimenting with innovations, and managing knowledge, thereby strengthening community agency.

3. Co-constitution Dimension: The Center acts as a mediating arena that facilitates transformation at both structural and agency levels through co-learning processes and the co-production of knowledge (Jasanoff, 2004).

3.4 Critical Interpretation of the Prototype City Concept

The findings of this study raise critical questions regarding the Prototype City concept within the context of the southern border area. The prototype city concept as it appears in policy often takes the form of a one-size-fits-all model, designed centrally and expected to be replicated in other areas. However, the study findings indicate that place-based context, particularly the history, cultural diversity, and dynamics of conflict in the southern border region, significantly impacts the implementation of the prototype city concept.

Urban development scholars such as Peck and Theodore (2015) have critiqued policy transfer and model city copying as overlooking the complexity of local contexts, potentially leading to policy failure. Therefore, developing Betong as a prototype city should emphasize processes of translation and adaptation rather than mimicry, with the local community playing a crucial role in defining the meaning and forms of success (McFarlane, 2011).

Conclusion and Recommendations

Conclusion: Theoretical Findings and Applications

This research explored and analyzed the knowledge landscape concerning prototype city development in Betong District through a synthesis of research and development projects conducted

between 2016 and 2020. The findings reflect a structural imbalance of the knowledge landscape, which predominantly emphasizes economic dimensions and tourism, while social and environmental dimensions received comparatively less attention. Nevertheless, the existing knowledge demonstrates varying degrees of connection to the principles of prototype city development for sustainable self-reliance. The Participation Principle emerged as a strength, whereas the Philosophy of Sufficiency Economy and the Principle of Community Development for Sustainable Self-Reliance still require more systematic integration.

Theoretical Implications

1. Extension of the Hybrid Development Approach: This study proposes that prototype city development in the southern border region necessitates a Hybrid Development Approach that integrates central policies (top-down) with community-driven forces (bottom-up), with a learning and innovation center serving as a crucial mechanism for navigating complex power relations.

2. Expansion of Structuration Theory in the Context of Urban Development: This study demonstrates that the establishment of a Center for Educational Research and Service Innovation can function as a structural transformation mechanism, helping to bridge the gap between policy and practice while empowering communities to play a role in shaping their own development trajectories.

3. Critique of the Prototype City Concept: This study highlights the limitations of the one-size-fits-all prototype city concept and argues that sustainable urban development must prioritize place-based context and processes of policy translation and adaptation over mere mimicry.

Practical Implications

1. For Policymakers and Research Funding Agencies: Funding structures should be adjusted to support long-term issues of importance to communities, such as environmental management

and drug problem resolution, alongside the promotion of tourism and economic development.

2. For Local Educational Institutions: The Center for Educational Research and Service Innovation proposed in this study should be developed to serve as a mediating arena among communities, researchers, and government agencies, fostering co-learning processes and reducing power gaps in determining development directions.

3. For Communities and Local Administrative Organizations: Capacity for participation in research and development processes should be strengthened, moving beyond the level of information provision toward shared agenda-setting and decision-making.

Recommendations for Future Research

1. Action Research to Develop Mechanisms Linking Policy and Community: In-depth research should be conducted on the operational processes of the proposed Center for Educational Research and Service Innovation to develop a knowledge management model appropriate for the context of the southern border region.

2. Research on Locally Appropriate Indicators for Prototype City Success: Measurement tools should be developed that do not focus solely on economic indicators but encompass social, cultural, environmental, and community well-being dimensions, in line with the concept of Holistic Development (Costanza et al., 2014).

3. Comparative Research on Prototype Cities across Different Regions: Comparative studies should examine prototype city development processes in areas with varying contexts to understand factors influencing the success and failure of policy transfer.

4. Critical Research on the Politics of Knowledge in Urban Development: Studies should investigate the research agenda-setting process to identify factors influencing the

selection of research topics and the implications of such selections for the sustainability of urban development.

Use of AI in this research

In this research, the researcher utilized artificial intelligence (AI) technologies as supportive tools to assist in verifying the accuracy of the research content, enhancing the quality of English language use, and organizing the research presentation in an academically appropriate manner. Specifically, the researcher employed ChatGPT as a supplementary tool to support content verification, content organization, and partial English language refinement during the research writing process. However, the use of AI tools in this study was strictly limited to supportive purposes. The researcher primarily and independently conducted the data analysis, content creation, and writing in accordance with academic principles. All suggestions generated by AI were carefully reviewed, verified for accuracy, and appropriately adapted by the researcher. Furthermore, all relevant sources of information have been properly cited in compliance with academic standards and ethical research practices. This approach was undertaken to ensure the integrity, accuracy, and academic credibility of the presented research work.

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