# Development of Evaluation Readiness Model for Smart Tourism Destination

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*Abstract*— **Smart tourism destination is a technology and information implementation in destinations of a territory /city. Behind the large investment spent on developing a smart tourism destination, many smart tourism destination projects have failed. One of the reasons is because the factors that must be prepared for smart tourism destination development is unclear. This paper aims to develop an evaluation readiness model for the smart tourism destinations initiation. There has not been research on the readiness model for smart tourism development yet. However, this model is needed to help the transformation of a destination into a smart tourism destination so that it can run well and sustainably. Literature studies were conducted to obtain various evaluation models on smart tourism, tourism destination management, and smart cities, which were then extracted into smart tourism destination readiness dimensions using comparative analysis. Considering that technology and information play a major role in a smart tourism destination, an alignment mapping between the identified dimensions and the technology and information governance components was carried out. The smart tourism destination dimensions identified become the basis of the formation of the smart tourism destination readiness evaluation model. Model validation is carried out with tourism stakeholders to ensure the model's suitability to real stakeholder needs using method triangulation qualitatively and quantitatively. Thematic Analysis is used as qualitative method and text classification using SVM algorithm is used as quantitative method.**

*Keywords*— *smart tourism, smart tourism destination, readiness, evaluation model*

## I. INTRODUCTION

Over the past six decades, the concept of "Smart" has become a keyword to describe how technology have influenced the growth of various sectors, including the tourism industry, and given rise to the smart tourism concept [1], [2]. Smart tourism is a tourism system that relies on smart technology to integrate the activities, needs, and distribution of tourist information for tourism stakeholders in order to enhance tourist experience, improve destination's resident well-being, and to increase competitive business value [3]. Smart tourism is also considered an extension of the smart city concept, where tourism is one of the sub-dimensions of the smart city dimension [4]. As the implementation of smart city initiatives continues to expand, smart tourism has also evolved as a trend for academics and practitioners from many countries and has been realized in the form of public investment programs[6], [7], including various countries in Europe, China, South Korea, and Japan [8].

A tourism destination must prepare itself to transform into a smart tourism destination. This preparation aims to avoid financial obstacles [9] and inefficient efforts in developing of smart tourism [10]. Measuring readiness becomes essential for several reasons, including serving as a guide in the transformation process [11], providing insights into what needs to be prepared for transformation [12], helping to predict financial requirements [9], identifying which areas need to change [13], and provides insights to stakeholders and planners about the status of existing conditions and infrastructures needs to be enhanced [13].

Not all attempts to create smart tourism destinations are succeeding. A contributing factor to the failure of smart tourist destinations is the absence of assessment techniques, which makes it challenging to launch or maintain these initiatives [7]. Although research on the creation of an evaluation system for smart tourist destination management has started, it is still very limited [14], and many of them are designed for specific case in certain destinations. There has been no research on how to assess the readiness of a destination to transform into a smart tourism destination. This research aims to develop an evaluation readiness model for smart tourism destination. The model is built from readiness dimensions that should be comprehensively prepared in the smart tourism destination development. Considering that technology and information play a major role in a smart tourism destination, an alignment mapping between the identified dimensions against the technology and information governance components was carried out referring to the existing IT governance framework. This helps ensure that the proposed dimensions are sufficient to IT governance in smart tourism destinations. To validate the model, method triangulation was carried out qualitatively and quantitatively using in-depth interviews of tourism stakeholders in Indonesia. Thus, the research questions are as follows:

1. What are dimensions required in the evaluation of smart tourism destination development readiness?

2. How do the proposed dimensions align with the components of information and technology governance?

3. How do the proposed dimensions align from the perspective of tourism sector stakeholders?

This paper is organized into five sections. The first section is an introduction that explains the research topic. The second section provides a literature review of the study. The third section is the research methodology, followed by the

results and discussion in the next section. The last section is the conclusion of the research.

## II. LITERATURE REVIEW

### A. Smart Tourism Destination

Information technology has proven to be a catalyst that accelerates innovation, including in the field of tourism [7], [15]. According to Gretzel (2015), the concept of "smart" depicts the application of information technology that relies on sensors, big data, open data, and new ways of information exchange (such as the Internet of Things, RFID, and NFC) [3], [16]. Many countries are trying to implement smart tourism destination concept, making smart tourism a trend and an unavoidable challenge [7]. Smart tourism destination presents a challenge for academics and practitioners in addressing how the field of Information Systems can be used to create new value in the tourism sector, thereby enhancing the existing tourism value through the provision of new designs for tourism information systems integrated with technology and social systems[7].

### B. Smart Tourism Evaluation System

Evaluation systems for smart tourism are currently being developed, although they are very limited in number [14]. These evaluation systems are derived based on a combination of smart tourism models, smart city evaluation models, and existing tourism evaluation models. Some of these models empirically have also been implemented in various countries. Indicator System of Smart Destination as research on the evaluation of development progress has been applied to several states in Spain and established as smart tourism destination implementation protocol in Spain. [14]. The next study was the measurement of coastal destinations on 14 coastal destinations in Spain [17]. Meanwhile other research are related to evaluating the maturity of smart tourism destinations implemented in several cities in Japan [7] and Swiss [18]. The limitation of these evaluation models in general lies in the involvement of human capital and culture dimensions in the measurement tools. This makes the existing evaluation model does not fully fulfil the dimensions of the smart tourism description model formulated by Boes (2015) [2], which has become the foundation of many smart tourism studies. In addition, not all evaluation models involve sustainability factors as a whole. Whereas as is known, currently sustainable tourism has become an important requirement in the implementation of tourism. Moreover, some of evaluation model is designed to be applied in specific type of tourism. Table 1 describes previous research on smart tourism destination evaluation model and their limitation.

TABLE I. PREVIOUS EVALUATION METHOD ON SMART TOURISM DESTINATION

| Author | Contribution | Dimension | Scope of Research |
|---|---|---|---|
| Ivars-Baidal, et al (2021) | Indicator System of Smart Destination Progress (Development Evaluation Model) | Governance, Sustainability, Innovation, Accessibility, Connectivity, Intelligence, Information, Online Marketing, Evolution of Tourism Activity | The model does not include cultural and human capital factors. |
| Huertas, et al (2019) | (SA)6 Evaluation Model of Destination Smartness (Development Evaluation Model) | Smart Amenities, Smart Attraction, Smart Accessibility, Smart Ancillary, Smart Activities, and Smart Available Package | The focus is on the outcome, not the dimensions that make up smart tourism. |
| Robles, et al (2020) | Indicator for Smart Coastal (Development Evaluation Model) | Smart Governance, Smart Environment, Universal Access, Smart Business, Smart Technology, Smart Innovation | The model is proposed for coastal tourism only. It does not include culture and human capital factor, and technology intelligence that less comprehensive disclosure. |
| Lim, et al (2019) | Smart Tourism Capability Maturity Model (Maturity Evaluation Model) | Smart Tourism Governance, Tourism Data and Resource Management, Infrastructure and Service Management, Enhancing Tourism Community Awareness, Co-Creation Facilitation, and Tourism Value Realization | The developed model primarily focuses on Governance, innovation, and technology dimensions. |
| Fux et al, (2020) | Maturity model designed for mountain resort tourism (Maturity Evaluation Model) | Culture, Connectivity, Customer Relationship Management, Content, Commerce, and Customer | The model is for mountain tourism only.This model does not comprehensively cover human capital, culture, and innovation. |
| Shafiee et al, (2019) | Sustainable Smart Tourism Destination Model. (Smart Tourism Destination Model) | Environment, Economic, Technology | Focus on limited dimensions. The model is not a measuring tool, so there are no indicators. |
| Boes et al , (2015) | Smart Tourism Destination Framework (Smart Tourism Destination Model) | Leadership, Human Capital, Entrepreneurship and Innovation, Social Capital | The model does not cover Governance dimension comprehensively. The model is not a measuring tool, so there are no indicators. |

### C. Information Technology Governance Components

Since information and technology are playing an important role now, IT governance of an organization is necessary to ensure benefits and goals are achieved, which also applies to smart tourism destinations. Nowadays, ITIL v4 and COBIT 2019 are the most widely applied IT governance framework in various businesses. ITIL v4 focuses on the need to manage the IT service life cycle consist of 4 service management dimensions that must be fulfilled, namely: (1) organization and people (2) information and technology (3) partner and supplier, (4) value streams and process [20]. Meanwhile COBIT 2019 focuses on comprehensive guidance to control risk and achieve

compliance, consist of seven components to achieve IT governance goals, namely: (1) Processes (2) Organizational Structures (3) Principles, Policies, and Framework (4) Information (5) Culture, Ethics, and Behavior (6) People, Skills, and Competencies, (7) Services, Infrastructure, and Applications [21]. To ensure that technology and information applied to smart tourism destinations can be managed properly, all components of information technology governance must be aligned with the dimensions of smart tourism destinations that have been identified.

## III. RESEARCH METHODOLOGY

This qualitative research is conducted through several stages using different methods as described in Fig. 1. The first stage is data collection, by review primary and secondary data using completed using *Preferred Reporting Items for Systematic Reviews and Meta-analyses* (PRISMA) method[22]. It aims to understand the state-of-the-art in research related to Smart Tourism Destination Readiness and Indicator. Emerald and Science Direct databases are used as sources of literature indexed in scopus using "Smart Tourism Readiness and Indicator" and "Smart City Readiness and Indicator" as keywords. The result of this activity is a summary of research that becomes input for the comparative analysis in the subsequent stages.
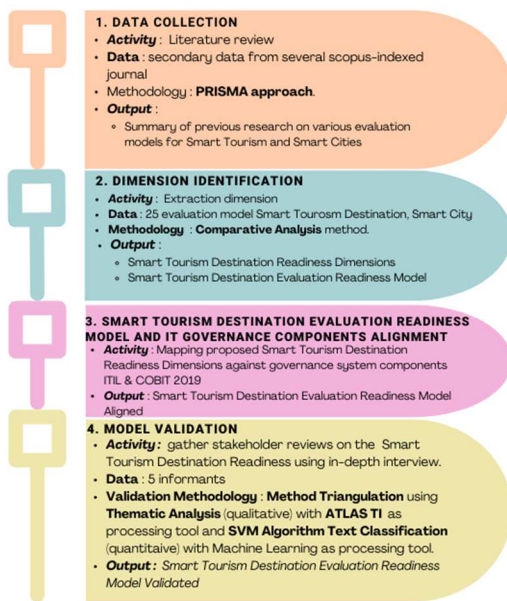


Fig. 1. Research Methodology

The second is dimension of readiness in smart tourism destination development identification stage involves a comparative analysis of 25 evaluation models revealed in the first stage. The third stage is mapping the proposed dimensions against the governance system components of ITIL v4 and COBIT 2019. Since IT plays a major role in smart tourism destinations, effective IT governance is needed. The last stage is model validation involve in depth interview with 5 informants representing Smart Tourism Destination stakeholders. The respondent profile is an informant who come from decision maker of tourism regulators and operators at the middle to top managerial level, as well as informants from academics with more than 5 years of experience in the field of tourism management. Method triangulation used to increase credibility and validity of this

research. The first triangulation was carried out with qualitative methods using thematic analysis. Thematic analysis aims to see the similarity of interview data patterns with the proposed dimensions [23]. Atlas TI application is used as processing tools. The steps of thematic analysis are described in Fig. 2. In order to compare the text classification on interview data with the proposed dimensions, the second triangulation is carried out quantitatively using the Support Vector Machine (SVM) technique [24] and Sastrawi Library as describe in Fig. 3. The text classification results of the in-depth interview dataset are expected to be classified according to the proposed dimensions.
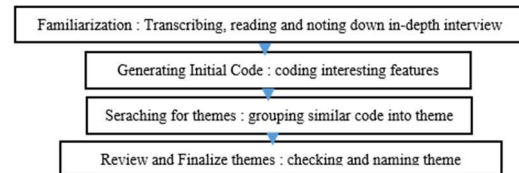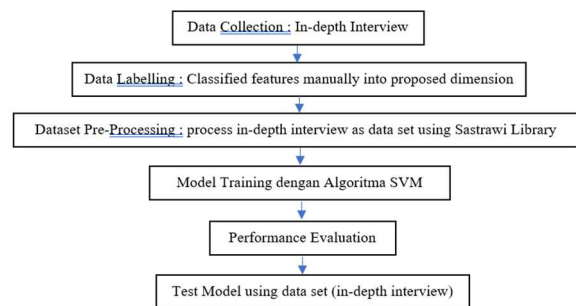


Fig. 2. Thematic Analysis Method



Fig. 3. Text Classification using SVM Algorithm and Sastrawi Library

## IV. RESULT AND DISCUSSION

### A. Data Collection and Dimension Identification

Based on the literature review with relevant keywords, 304 Scopus-indexed papers were found. However, considering several criteria for relevance, such as title alignment with the research topic and the content of abstracts, only 51 papers will be further examined. From these papers, 25 evaluation models were identified, with a total of nearly 150 dimensions. Table 2 provides details of the studied measurement models.

TABLE II. EVALUATION MODEL ON SMART CITY AND SMART TOURISM

| ID | Type | Author | Year | Number of Dimensions | Method |
|---|---|---|---|---|---|
| EM1 | Smart Tourism Indicator | Baidal, et al | 2021 | 9 | A |
| EM2 | Smart Tourism Indicator | Robles, et al | 2020 | 7 | N/A |
| EM3 | Smart Tourism Indicator | Huertas, et al | 2019 | 6 | A |
| EM4 | Smart Tourism Maturity Model | Lim, et al | 2019 | 5 | A |
| EM5 | Smart Tourism Maturity Model | Fux, et al | 2020 | 6 | N/A |

| EM6 | Smart Tourism Model | Shafiee, et al | 2019 | 3 | N/A |
|---|---|---|---|---|---|
| EM7 | Smart Tourism Framework | Boes, et al | 2015 | 4 | N/A |
| EM8 | Sustainable Tourism Indicator | GSTC | 2021 | 10 | A |
| EM9 | Competitive Tourism Indicator | Kemenpare-kraf RI | 2022 | 16 | A |
| EM10 | Competitive Tourism Indicator | WEF | 2022 | 15 | A |
| EM11 | Smart City Indicator | Centre for Livable Cites | 2014 | 16 | N/A |
| EM12 | Smart City Indicator | IMD World Competitiveness Center | 2023 | 5 | A |
| EM13 | Smart City Indicator | SNI | 2019 | 19 | A |
| EM14 | Smart City Indicator | Cohen | 2014 | 6 | N/A |
| EM15 | Sustainable Tourism Indicator | GSTC/UNWTO | 2019 | 4 | A |
| EM16 | Smart City Readiness | Pratama, et al | 2019 | 4 | N/A |
| EM17 | Smart City Readiness | R. Mahesa, et al | 2019 | 9 | N/A |
| EM18 | Smart City Indicator | Yufei Fang, et al | 2022 | 9 | A |
| EM19 | Smart City Indicator | Giffinger, et al | 2007 | 6 | A |
| EM20 | Smart City Indicator | Fachinelli, et al | 2022 | 4 | A |
| EM21 | Smart City Maturity | Rytova, et al | 2020 |  | N/A |
| EM22 | Smart City Readiness | Zhao, et al | 2021 | 4 | A |
| EM23 | Smart City Readiness | Ibrahim et al | 2017 | 3 | N/A |
| EM24 | Smart City Indicator | Dewi et al | 2018 | 11 | N/A |
| EM25 | Smart City Indicator | IBM City Index | 2009 | 7 | A |

Due to the similarity of scope and definition of dimensions among the analyzed models, dimension extraction was performed by grouping these dimensions into more representative dimensions. Comparative analysis resulted in 7 dominant dimensions (Table 3): Governance, Environment, Accessibility, Innovation, Human Capital, Smartness Transformation, and Culture.

TABLE III.         COMPARATIVE ANALYSIS PROCESS

| ID | Governance | Environment | Accessibility | Innovation | Human Capital | Smartness Transformation | Culture |
|---|---|---|---|---|---|---|---|
| EM1 | √ | √ | √ | √ | √ | √ | √ |
| EM2 | √ | √ | √ | √ |  | √ | √ |
| EM3 | √ | √ | √ | √ | √ | √ | √ |
| EM4 | √ | √ | √ |  | √ | √ | √ |
| EM5 | √ | √ | √ |  |  | √ |  |
| EM6 |  |  | √ |  |  | √ |  |
| EM7 | √ | √ | √ |  | √ | √ |  |
| EM8 | √ | √ | √ | √ | √ | √ |  |
| EM9 | √ | √ | √ |  |  |  |  |
| EM10 | √ | √ | √ |  | √ | √ | √ |
| EM11 |  | √ | √ |  |  |  |  |
| EM12 |  | √ | √ |  |  | √ | √ |
| EM13 | √ | √ |  | √ |  | √ | √ |
| EM14 |  |  |  | √ |  |  | √ |
| EM15 | √ | √ | √ | √ | √ |  |  |
| EM16 | √ | √ | √ |  |  | √ |  |
| EM17 | √ | √ | √ |  |  | √ |  |
| EM18 | √ | √ | √ | √ | √ | √ | √ |
| EM19 | √ | √ | √ |  | √ | √ |  |
| EM20 | √ | √ | √ |  | √ | √ | √ |
| EM21 | √ | √ | √ |  |  | √ |  |
| EM22 | √ | √ | √ |  |  | √ | √ |
| EM23 | √ | √ |  |  | √ | √ | √ |
| EM24 |  | √ |  |  |  |  |  |
| EM25 | √ |  | √ |  |  | v | √ |
| **Total** | 19 | 21 | 19 | 11 | 11 | 19 | 13 |

*1) Governance*

Governance encompasses strategic planning and management approaches, collaboration between the public and private sectors, and administrative coordination in smart tourism destinations[14], [17], [25], [26]. Ideally, there should be a responsible organization in a smart tourism destination that oversees strategic planning, including financial aspects [12], [27], [28] and coordination with the smart city authority in the strategic planning of both the city and smart tourism should also be in place [7], [29].

*2) Environment*

The environmental dimension *encompasses* various factors, including rational and efficient natural resource management in implementing sustainable tourism. [14], [27], [30]. Additionally, creating a healthy and safe environment in a smart tourism destination [25], [26], [27], [30], [31], [32] become factors that must be taken into account.

*3) Accessibility*

Accessibility is the ease of physically accessing a destination and obtaining destination information for people of all backgrounds, including individuals with disabilities. [14], [17], [25], [26], [29], [32], [33], [34] This includes the availability of air, sea, and land transportation infrastructure; clear signage and information at tourist destinations; ease of internet connectivity, and so on.

*4) Innovation*

Smart tourism destinations should facilitate digital talent to collaborate with smart tourism destination initiatives for continuous smart tourism destination development [14], [35]. This can be reflected in the presence of good education, including IT education, at the destination [9], [14], [28], [35], good startup business growth [28], and the availability IT Professional [12].

*5) Smart Transformation*

Smart transformation is the technology-related process that a destination must prepare for as a smart tourism destination consists of three stages: instrumentation, interconnection, and intelligence[36]. This dimension is proposed because existing evaluation systems does not clearly depict the transformation process. Instrumentation refers to directly acquiring data from the real world, such as sensors, smartphones, and similar

data, including social networks. This can be reflected in the availability of information technology infrastructure, such as a good internet connection [12], [14], [25], [26], [29], [32], [33] RFID, NFC, QR codes, sensors, IoT, etc. [17], [26], [50]. Interconnection is an effort to integrate data from instrumentation into various business processes for different purposes among users [7], [12], [14], [17], [26], [34]. Meanwhile, intelligence is the effort to analyze data resulting from interconnection to generate knowledge that can guide stakeholders of smart tourism destinations in making decisions and providing more personalized and valuable experiences [14], [17], [33].

*6) Human Capital*

Smart tourism destination should have people with a Human Development Index (HDI) [37], as well as good ICT literation [27] which can be achieve through easy access to good education [35], the availability of IT consultants or professionals [38] to support the existence of digital technology startups and the increase in the number of startup businesses [28] and community of creative talents dedicated to preserving sustainable smart tourism destination program [14] .

*7) Culture*

Culture refers to the attitude towards the ongoing transformation. It can be represented by policy adjustments in the environment to adapt to new activities [25], [26], support and legal commitment from stakeholders to align their bureaucracy with the smart tourism destination program [18] and a willingness to collaborate or engage in healthy competition to achieve the goals of the smart tourism destination ecosystem [14], [17], [33], [35]. The willingness of stakeholders to adapt and use social, business, and government applications [12] in a smart tourism destination will also become a culture that marks the success of the transformation. Fig. 4 shows the results of dimension in the form of readiness model of smart tourism destination.
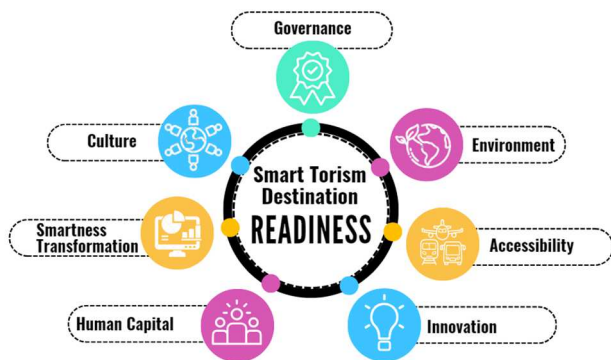


Fig. 4.  Smart Tourism Destination Readiness Model

*B. Smart Tourism Destination Model and IT Governance Alignment*

The concept of smart tourism is heavily reliant on information technology to provide reliable IT services to its stakeholders [2]. Hence, the dimensions obtained are then mapped with the IT governance components of ITIL v4 and COBIT 2019 to ensure governance of IT implementation in providing IT service at smart tourism destination. Table 4 and Table 5 below show that all of the identified dimensions can be mapped into IT governance components of ITIL v4 and COBIT 2019 so that it can be ensured that information

technology in smart tourism destinations can also be governed in order to achieve smart tourism destination goals.

TABLE IV.    MAPPING PROCESS BETWEEN SMART TOURISM DESTINATION DIMENSIONS AND GOVERNANCE DIMENSIONS OF ITIL v4

| STD Dimension | Organization and People | Information Technology | Partner and Supplier | Value Streams and Process |
|---|---|---|---|---|
| Governance | √ | | √ | |
| Environment | | | | √ |
| Accessibility | | | | √ |
| Innovation | | √ | | √ |
| Technology | | √ | | |
| Human Capital | √ | | | |
| Culture | √ | | √ | |

TABLE V.    MAPPING PROCESS BETWEEN SMART TOURISM DESTINATION DIMENSIONS AND GOVERNANCE SYSTEM COMPONENTS OF COBIT 2019

| STD Dimension | Proces | Organization Structure | Principle and Policies | Information | Culture and Behaviour | People, Skill and Competency |
|---|---|---|---|---|---|---|
| Governance | √ | √ | √ | √ | | |
| Environment | √ | | √ | √ | | |
| Accessibility | √ | | | √ | | |
| Innovation | √ | | | | | |
| Technology | √ | | | √ | | |
| Human Capital | | | | | | √ |
| Culture | | | | | √ | |

The following is an explanation of the governance components that are mapped based on the proposed dimensions:

*1) Mapping with ITIL v4*

*a) Organization and People*

There is a responsible organization that facilitates the collaboration of tourism stakeholders in managing smart tourism destinations and needs competent human capital[39].

*b) Information Technology*

Information Technology plays an important role in assisting the management of smart tourism destinations, enhancing the tourism experience[17], [18], [39], [40].

*c) Partner and Supplier*

The success of a smart tourism destination is determined by stakeholders collaboration in providing tourism services[39].

*d) Value Stream and Processes*

Co-creation activities is how stakeholders and tourists process to produce experiences for tourists and business value for stakeholders [41], [42].

*2) Mapping with COBIT*

*a) Process*

To create a competitive, sustainable, and resilient tourist destination, there is a need to establish rules and mechanisms for smart tourism destination governance [43]. Collaboration tourism stakeholders determine the direction and goals of the

program as well as the implementation of strategies [14], [17], [26].

*b) Structure Organization*

There is a need for a responsible organization [44] that can orchestrate the interests of various stakeholders within the tourist destination [7], [14], [17], [44].

*c) Principle, Policy and Procedure*

Various policies and procedures require in IT governance of a smart tourism destination to ensure the successful implementation of this project [45],[46] .

*d) Information*

This information encompasses data acquired through various channels [17], and all othe information opened and shared by stakeholders[33]. The implementation of business intelligence is necessary to enhance the value of information and support strategic and operational decision-making in a smart tourism destination [14], [17], [33], [35].

*e) Culture, Ethics and Behaviour*

Culture encompasses the adaptation of environmental policies to smart tourism destination activities [25], [26], the awareness of collaborating to achieve the goals of the smart tourism destination ecosystem [14], [17], [35].

*f) People, Skill and Competencies*

Availability of IT consultants/professionals which is reflected in their good ICT literacy[12], [25], [26], [38].

*g) Service, Infrastructure and Application*

This is reflected, in the ease of internet connectivity [14], [17], [26], the availability of various social, business, and government applications [7] and the use of smart technologies to support service delivery.

*C. Smart Tourism Destination Evaluation Readiness Model Validation*

Model validation was conducted using in-depth interviews and validated qualitatively using thematic analysis approach and quantitatively using text classification with SVM algorithm. In-depth interview involved 5 tourism stakeholder as informants, including representatives from the Ministry of Tourism and Creative Economy of the Republic of Indonesia, Destination Authority Bureau, Tourism Business Operator, City Department of Tourism, and Tourism Academician.

Thematic analysis of in-depth interview using Atlas TI as processing tool is depicted in Fig. 5 below. Based on the diagram, it can be seen that the proposed dimensions are valid because all of the identified themes are in accordance with the results of in-depth interviews from tourism stakeholders. Text classification of in-depth interview using SVM algorithm and sastrawi library result that 77% of dataset classified successfully. Because the distribution of features as keywords is less than 30 per class, the accuracy has not been able to get above 80%. Therefore, in order to improve accuracy, it is required to enhance the feature dispersion. [24].
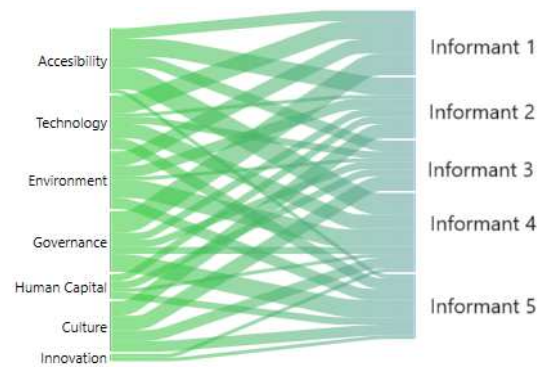


Fig. 5. Sunkey Diagram of Smart toursim Destination Evaluation Readiness Model

## V. CONCLUSION

This qualitative research aims to identify the dimensions forming the Smart Tourism Destination evaluation readiness model. A comparative analysis was conducted to extract dimensions from 25 smart tourism and smart city evaluation models into seven dominant dimensions. They are governance, environment, human capital, innovation, smartness transformation, and culture. To ensure effective governance information technology in Smart Tourism Destinations, the proposed dimensions were mapped to the ITIL v4 and COBIT 2019 governance system components. The results indicate that all of the proposoed dimensions can be mapped into these governance system components. In-depth interviews were conducted and validated using method triangulation qualitatively and quantitatively. The qualitative validation results show that there is congruence between the themes and the proposed dimensions. Meanwhile, the quantitative validation results show that the classification results from the interview dataset match the proposed dimensions. The limitation of this research lies in qualitative method in extracting the model dimensions. Clustering a large number of the referred evaluation model keywords using machine learning is one technique to improve the extraction result. Thus, the extraction process will provide better results.

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