Website as Co-Created Decision Support System Towards Enhanced Experience of Solo City Tourism

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Abstract. *The linkage among information-intensive era, technology, and tourism industry build an inseparable genetic relationship which is supposed to be realized in practice. Let alone in this digital era, the urgency to exploit information to the next level resulted in the need to bring a higher game on the technology to manage information effectively and efficiently. The tourism industry is categorized as complex system regarding the components substituted it. The diverse elements which interact with dynamics pace give birth to complex tasks to manage by the responsible parties and consequently enhance the experience in tourism industry. Competing with complex situation, computerized decision system is urgently needed to collect and also distribute accurate knowledge of tourism industry, collaborate with both supporting public and private sectors, and gain rationality for all stakeholders in the system. Solo city, also known as Surakarta and located in Central Java (Indonesia), is obliged to do its tourism industry justice as it is an important vehicle for the regional development of the city. The tourism industry of Solo city represents the major and significant contributor to the local economy to the point where tourism is the brand of Solo city. Taking the prior research finding, value orchestration platform to promote tourism in batik Solo industrial cluster into the reference, this study improves the model by highlighting the duality function the tourism website supposed to have using hashtag (#) minings principle as the latest user interface technology. This study proposes a collaborative website platform as a co-created decision support system to enhance tourism experience for tourist as consumer and optimize management process for Department of Culture and Tourism of Solo city as provider.*

Keywords: *Decision support system, hashtag mining, service-dominant logic, solo city, tourism experience*

1. Information-Intensive World and The Consequences of Technology in Tourism Industry

Information is the key element of tourism industry in this digital era (Sezgin, 2013). For its notable function in the industry, Poon (1993) even described information as the significant intangible product of tourism which has equal role in the daily operations. The fast changing information flow gradually transforms the industry into a dynamic system where flexible structure, online reference and opinion, transportation and accommodation technology development are introduced (Baggio & Caporarello, 2005). An appropriate illustration for the case should be taken from Cooper (2006), which categorizes tourism experience into two sides: supply and demand sides. Supply side is defined as the tourism industry itself which formulate all management aspects from planning, developing, organizing products and services, and managing infrastructures needed to make sure that the industry optimally processes and use information gathered (Buhalis, 2003). The information comes from various sources for instances incoming visitors, tourists, locals, or even internal persons. Demand side represents the tourist where their experiences consist of four levels from preparatory, decision-making, itinerary and evaluation levels. Each level involves inherent processes which require a whole lot of information to review and refresh their knowledge about the destination and build expectation to the future experiences (Gunn, 1994). A comprehensive study by Dooseon and Mi-Hea (2015) reinforces this finding by stating that, based on in-depth interviews, the categories of the memory of experience, interaction with others, and roles of companions, which mostly

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depends on information supply, are influencing factors through all tourism experience levels from preparatory to evaluation. Both supply and demand sides affirm from the illustration that information is vital for tourism industry. As a result from the urgency to exploit information to the next level is the need to bring a higher game on the technology to manage it effectively, efficiently, and consequently enhance experience in tourism industry (Neuhofer, 2014).

The linkage among information-intensive era, technology, and tourism industry build an inseparable genetic relationship which is supposed to be realized in practice. The implementation of the relationship varies form web 2.0 with augmented reality and QR code (Fino et al., 2013), tourism mobile application (Wang, 2013; Zarmpou et al., 2014), smart tourism system (Perez-Jimenez, 2015), to Geographic Information System (GIS; Li, 2016). From the examples, technology in the relationship takes part as a platform for information access published by stakeholders of the tourism industry as provider. Therefore, the information flow mainly in the internal part of the provider and it makes the information flow to the tourist as consumer one-way communication.

Prahalad and Ramaswamy (2004) emphasizes on the recognition of active and empowered consumers regarding technological mediation to accommodate the advanced idea of co-creation in tourism industry. Indeed, consumers nowadays has become a key notion in the world of tourism as they hold power in co-creating their experiences in quest for personal growth (Prahalad & Ramaswamy, 2004), shaping the destination competitive advantage (Morgan et al., 2010), and acting as word-of-mouth agents (Setiawan et al., 2014) in the industry. In this process, different forms of technology from websites, blogs, recommendations, virtual references, social networking sites, and online applications are also involved to facilitate the acceleration of the information distribution process (Tussyadiah & Fesenmaier, 2009). These

suggest that not only information matters in all levels of tourism experiences from preparatory to evaluation but also the enhanced co-creation technology as the major role instead of provider-sided one. Based on the underlying theories, this study departed of a wonder to explore the mechanism to integrate the concepts of co-creation and technology in a tourism website to make a more customer-friendly tourism industry.

2. Website as Co-Created Decision Support System: Provider and Customer Perspective

The tourism industry is categorized as complex system regarding the components substituted it. The diverse elements which interact with dynamics pace give birth to complex tasks to manage by the responsible parties. Buhalis (2003) emphasizes a Decision Support System (DSS) to be able to collect accurate knowledge of the destination and collaborate with both supporting public and private sectors to bring improvement to the social and economic sectors. DSS takes form in many different ways including website which is a large feedback cycle in which each phase is connected to another via activities that consist processing a high number of elements (Baggio & Caporarello, 2005).

In tourism industry context, a possible scenario of the proposed DSS is by combining user interface, communication layer with three core components: knowledge, model, and data base. User interface is typically a graphic interface where the users interact with the system. It has the responsibility to manage the authorization system which creates different task for different user typologies. Communication layer practically allows users to access the components needed from knowledge to data base. Knowledge (also called public library) and data base (often use GIS) as the core components are based on a distributed infrastructure including server and web-based application.
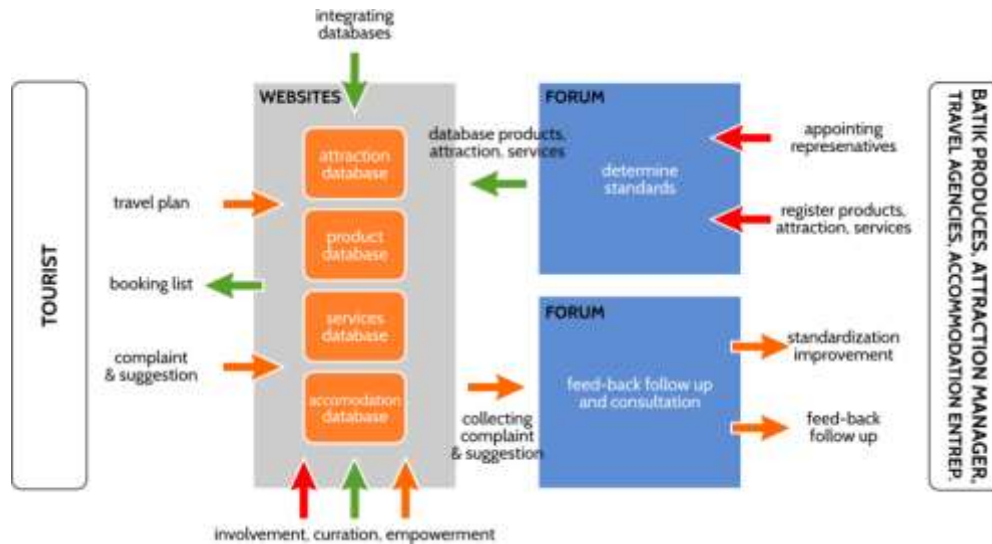
Figure 1. Co-creation Platform for Batik Solo Industrial Cluster Proposed by Novani et al., 2014.

Both of them are similar in information-loaded characteristics which enrich and empower users towards the tourism destination. While model base is the operation behind the scene of decision support systems which employ different algorithms from decision trees to zero-sum game theory. Although DSS may face some challenges from technological, economic, and social and behavioral challenges, computerized decision system is essential to shape a more rational thinking framework for improving capability and make the most of tourism experience. The attitude towards a system enables both provider and customer gain rational inputs to support the complex decisions required in the tourism-related actions. The ultimate concerns lay on the acceptance of the website as a co-created DSS which is strongly triggered by the usefulness, easiness, and positivity perceived (Gretzel el al., 2006).

2.1. Reference from Value Co-Creation Platform in Batik Solo Industrial Cluster

In line with the findings from previous literature review that DSS enables communicative framework to create a more rational thinking and winning collaborations among stakeholders, service-dominant logic also takes a credit for the similar idea. Value co-creation moves from teaching the customer to learning from each other and build provider-customer mutual understanding and win-win relationship. It causes both provider and customer to leverage their individual and shared experiences together, creating something that both could not have produced separately or in the traditional ways such what happens in value creation phase or merely the value created in the process. A study by Lorenzo-Romero et al. (2014) reveals that although there is a category of non-motivated co-creators, motivated ones outplays the non-motivated one in online platforms like social media and websites. This is a convincing springboard for this study as it supports the possibility of value co-creation in virtual world in the context of tourism industry.

Furthermore, three management strategies of value orchestration platform for orchestrating value co-creation process such as involvement, curation, and empowerment strategies (Novani et al., 2014) are explained in Figure 1. The model provides a two-sided platform to promote tourism industry of Solo city which leaves the control entirely to provider. The first management stage is involvement where a strategy for the platform to attract and involve customers and providers is taken. Value curation is essential for the platform to encourage customers and providers to co-elevate and co-develop. The closing stage is empowerment which acts as a resolution stage where a harmonious orchestration has been achieved by both provider and consumer.

Figure 1 divides the platform into front stage and back stage. The front stage acts as user interface which communicates directly with tourist as consumer regarding travel plan, booking list and complains and suggestion page. The front page also functions a duality that invites collaboration with batik producers, accommodation enterprises, and travel agencies in the form of forum. On the opposite, the back stage is under the authority of provider to manage and update data base. The model adopts value co-creation in the light of feedback sent by tourist as value co-creator, although the feedback is still limited in the form of complaint and suggestion. This model is line with the conventional principle of DSS and can be further improved using the latest form of user interface technology.

3. Methodology

As a conceptual study to pilot the series of Solo city tourism improvement, this study is systematically written based on a methodological framework as illustrated in Figure 1. This study covers the first three of the stages in the framework. The first stage is problem identification which focuses on the technical aspect (website condition) and also social aspect (stakeholder perception). The second stage of the study is data collection which employs Forum Group Discussion (FGD) as the main methods to integrate the vision of both researchers with the academic philosophy and the stakeholders with the needs and urgencies. The third stage combines the results from the first and second stages to make the proposed model of the improved website. The sub-chapter of methodology in this study consists of two parts: the need of website improvement and evaluation of condition of the official website of Solo city tourism industry.
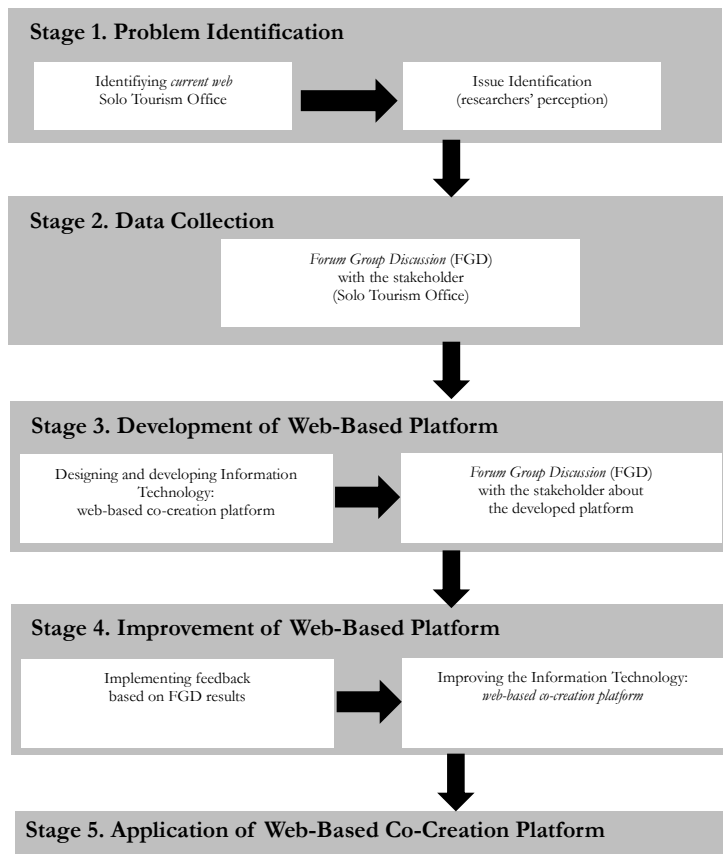

Figure 2. Methodological Framework of The Study.

3.1. The Need of Website Improvement

Solo city, also known as Surakarta and located in Central Java (Indonesia), is obliged to do its tourism industry justice as it is an important vehicle for regional development of the city. Tourism industry of Solo city represents the major and significant contributor to the local economy to the point where tourism is the brand of Solo city. Riyadi (2009) support the fact by stating that strategy to generate income through the sectors tourism has occurred in Indonesia since the implementation of regional autonomy. As one of the implementation from of city branding, several cities in Indonesia launched the tagline to emphasize their identities. It is presented in the article Come on City Branding at SWA magazine dated June 14, 2007, that in 2001 the present positioning of Jogja Yogyakarta is The Never Ending Asia, Semarang in late 2006 launched The Beauty of Asia, Jakarta shows Enjoy Jakarta and in the same year, carrying the brand Solo Surakarta: The Spirit of Java. Simon Anholt in Moilanen and Rainisto (2009) defines the city branding as the image of a destination management through strategic innovation and economic coordination, commercial, social, cultural, and government regulations. Kavaratzis (2008) has previously believed that city branding focuses on the management of the image, exactly what and how image will be established as well as aspects of communications made in the image-management process. These emphasize the urge on communication and management of information regarding the best feature owned by the city to the public so the image as favorable destination can be built.

A focused-group discussion (FGD) was held between research team members of sub interest-group of decision making and strategic negotiation (DMSN SBM ITB) and Dinas Kebudayaan dan Pariwisata Kota Solo (Department of Culture and Tourism of Solo city) on last May 23rd, 2016. The FGD process was attended by 10 participants, 4 from DMSN SBM ITB and 6 from the department. It aimed to find the most operational way to deliver the concept of value co-creation based on service-dominant logic to the situation faced in tourism industry of Solo city. The research cooperation between the two parties has been developed for 4 year started with cluster soft system methodology application in batik Solo industrial cluster (Novani et al., 2014), value orchestration platform to promote tourism in batik Solo industrial cluster (Novani et al., 2015), and understand tourism industry of the city as an sustainable entrepreneurial system (Mayangsari et al., 2015).

Those prior researches concentrated on the conceptual frameworks on value co-creation until the results are acknowledged scientifically and proven by international publication acceptances. This stage of the research series engages as the dessert of the full course. Based on the literature review on the information, technology mediation and tourism as the city branding, website is one of the most feasible platforms to be utilized in order to enhance the tourism experience in Solo city. The head of Department of Culture and Tourism of Solo city, Eny Tyasni Susana, strongly agreed on this statement. She believes that the moment is perfect to improve the quality of Solo city website as in 2016 the city has been selected as top 10 destinations around Borobudur temple by the Government of Central Java province. More detailed description on this subject is located in sub chapter 3.1 which explain the existing condition of official website owned by Department of Culture and Tourism of Solo city and the improvements needed.

3.2. Existing Condition

Pariwisatasolo.surakarta.go.id is the official website of Department of Culture and Tourism of Solo city which is constructed to inform the publics and potential tourists all interesting things in Solo City. One of the problems is that the website has not become the main source of information for Solo city tourism. With keyword of Kota Solo (Solo city), Wisata Kota Solo (Solo city tourism) and Tourism in Solo, the website cannot be found on first page of Google as the search engine. However, this slightly changes after the keyword becomes Pariwisata Kota Solo (Solo

city tourism-in a more formal Bahasa) as the website appears on the first page. The fact that the website loses the game among the other customer-based sources like blogs or travel agents urge Department of Culture and Tourism of Solo city to evaluate or add the keywords in terms of searching engine optimization (SEO). If the website is still difficult to be found in the search engine, it means that tourists are also difficult to find secure information about tourism in Solo City.

The interesting things have not been officially published by Department of Culture and Tourism of Solo city as the provider. The website provides information on the potential tourism sites and closest events held in the city. Based on the feature found in the website, there are several menus that can be accessed from News, Tourism, Agenda, Gallery, and Video. The language menu and some closest events also appear on the front page of the website. Each menu is linked with short content describing related information in Bahasa. The language menu did not seem to work properly in the content. Related to language, the Head of Department of Culture and Tourism of Solo city, the tourism industry is not only targeted to local tourists, but also international tourists. Language becomes vital shortly. English, French, and Chinese are the top priorities summarized in the FGD. Department of Culture and Tourism of Solo

city provides a Tourist Information Center (TIC) for information about object of tourism, transportation, accommodation, shopping center, culinary places in English. However, it is still not efficient because there are only three locations of TIC such as in the office of Department of Culture and Tourism at Jalan Slamet Riyadhi, Solo Balapan Railway station, and Adi Sutjipto Airport. Setiyadi (2013) in his study stated that Solo City need to develop e-map of Solo city tourism as guidance for tourists to reach tourism sites and objects in more practical and independent way.

In another word, the completeness of information in the website plays an important role since it can be accessed anywhere and anytime. The website is also helpful for tourists to gather knowledge about Solo city in preparatory level of tourism experience. As in the decision-making level, the knowledge plays an important role to help to transform potential tourists into the real incoming visitor of the city. The knowledge then collaborates with the actual information provided in the website regarding map, transportation, and accommodation to help tourists plan their travel itinerary. The feedback platform provided in the website can mediate the evaluation from the experience tourists get during the travel in the city.

Table 1.
Evaluation and proposed improvement of official tourism website of Solo city.

Before	After
Hardly found on the first page of search engine results.	Keywords optimization needed.
Tourism information and events in Solo have not been attractively described.	The department can collaborate with event organizers to provide complete and attractive information about the events periodically.
Available comprehensive information is only in Bahasa Indonesia.	Turn the translation function on into English, French, and Chinese using integrated machine.
Information is also accessible in social media accounts of the department e.g., Twitter, Facebook, and Instagram.	Those accounts work independently. The website must be improved as an integrator of what happen in the accounts.
No space for sharing experience by the tourists.	Using hashtags, tourists can contribute improving first-hand experiences from their social media accounts automatically to the website content.
There is no map of tourism sites.	Accessible and user-friendly tourism sites map.

| No information about transportation and accommodation available in the website. | Provide a collaboration space for service provider companies as third party by using hypertext linked to their websites. |
| Data input is solely done by Department of Tourism and Culture of Solo city. | Platform for collaborative data input is provided for vendors and merchants as supplier and visitors as customers. |

Department of Culture and Tourism of Solo city has created social media accounts such as Twitter, Facebook, and Instagram to reach broader scope of tourist. The accounts are connected to website and tourists can get more real-time information from them. However, the hype of those social accounts is rather short term and gradually become more passive that the first time they are made. All of the social media accounts only contain information from internal department as the provider of tourism experience in the city.

There is no space for tourists to share their experience. This fact is contradictive with the statement of Varhooef et.al. (2009) that customer experience plays important role to attract more customers. In this context, customer means tourist. Service-dominant logic perceives this problem as value co-creation which grants consumers to work with company-provided resources in the production of their value offerings (Ramaswamy, 2009).

Adopting this collaborative approach necessitates a fundamental shift in considering consumers not again as end consumers, but co-creators instead. Looking at how customers value influence Solo city as tourism destination, it is wise for Department of Culture and Tourism of Solo city to develop space for tourists to share their experience and engage to promote and attract more tourists to visit Solo City. Table 1 summarizes the existing condition and the improvement needed as the backbone of the result of this study which emphasizes on the collaboration space among stakeholders including tourists as customer to create a lively dynamic ambiance in the website of Department of Culture and Tourism of Solo city as the provider.

4. Proposed DSS Conceptual Model based on Value Co-Creation Platform

This chapter raised two leading topics as the findings of the study. The first topic is the role of hashtag mining and hypertext to service mediator. The second topic discusses how to integrate both of hashtag mining and hypertext to service provider in the main website of Department of Culture and Tourism of Solo city as the space for consumers contribution to co-create. The integrated version of the website which functions as DSS for both Department of Culture and Tourism of Solo city as provider and potential incoming tourists as customer is illustrated in the proposed model. This study emphasizes on the conceptual framework of the model which is the fundamental principles of the real website construction – on-going process.

One of communication media in digital era is micro-blogging which is limited space for 140-200 characters text (Setiawan et al., 2014) such as Twitter. Online communication as the virtual media for invention, creation, and content sharing are the origin of web 2.0, social media, and new dimension of marketing. Information exposure from social media establishes followers interest (Suwanto, 2014) which can also be regarded as the main capital in marketing. The interest of followers, as word-of-mouth agents and potential customers, is the seed of online interpersonal influence to exert powerful influences upon each other and with the spread of electronic technologies, it is not surprising that virtual interactions among them have proliferated. In the case of the tourism industry of Solo city, it is a loss that the social media accounts act individually without being integrated into the website.

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Benchmarking from the case of Singapore, yoursingapore.com, the value of customer experience is highly respected that the space for sharing from the first-hands is provided. Everything the tourists is posted in their accounts, as long as they use #YourSingapore, it will be directly posted on the website. The technology enables direct posting from hashtags is called hashtag mining. Not only it adds personal touch on the website and orchestrates value co-creation, but hashtag mining is a short cut to a more convenient website content management for the provider which is Department of Culture and Tourism of Solo city. Provider put extra effort to construct the space. However, the rest of the task is nothing else but management control.

From the same benchmarking website, yoursingapore.com,the website collaborates with an official partner for providing further information needed in related services from transportation to accommodation which is tripadvisor. It is very convenient for both provider and consumer because the platform is the only media needed to enable the direct communication between customer and TripAdvisor as the mediator. Same way, the technology called hypertext, in this case is very convenient for customers as the can access a more comprehensive information right from the source. In the case of Solo city, one of the problems its website has is the minimum information disp layed by the provider. Thus, collaboration via hypertext technology is one promising option to present a more convenient information-collection experience for customer. The parts can vary in many ways from international partner such as TripAdvisor or traveloka to local partner such as ASITA (Association of the Indonesian Tours & Travel Agencies) which has gained a good reputation in Solo city.

5. Discussion

Although this study focuses on the conceptual framework, the finding is employed as the fundamental input of the website construction process – on-going. A new proposed model of website owned by Department of Culture and Tourism of Solo city reveals a brand new image of Solo city tourism. The model has been approved by the head of the department, Eny Tyasni Susana, in the last focused group discussion on May 23rd, 2016. The proposed model took value co-creation principle from service-dominant logic into consideration. Referring from the theory of website as a computerized decision system tool, this model represented the next version of the city website as a more integrated platform in order to create a more rational decision for both Department of Culture and Tourism of Solo city as provider and tourist as customer.

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