

# Decision-Making Process in Small Medium Enterprise: Application of Business Analytics Methodology and Linking Model

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**Abstract:** The popularity of business analysis has increased rapidly in the last decade and presents a challenge for organizations to understand how to use it achieve business goals and create a competitive advantage. The object of this research is the NAH Project, which is a small-medium enterprise. They overwhelmed to complete the targets and also had difficulty in making strategies for the future to maintain their revenue. They must find out what's popular or trends, optimizing prices for competitive advantage, finding what will be sold next, etc. through business analytics. In developing business analytics capabilities, they must know what kind of data that helpful and meaningful for them to know the customer expectation. In this research the approach of Business Analytics Methodology (BAM) combined with Linking Model. BAM has four stages: problem situation, business model mapping, analytic leverage, and analytics implementation. Linking model also has four layers' hierarchy: process map, decision, analysis, and data items. Both of approach used to explore the problem that occurs and helps the company to make a decision using data items. The research findings are the 34 types of data needed by the NAH Project in developing business analytical skills to enhance their competitive advantage.

## 1 INTRODUCTION

Small Medium Enterprise (SME) is a small-scale economic activity of the people with a business sector which is a majority of small-scale business activities and needs to be protected to prevent unfair business competition. In 2017, SME contributed 57.08% or around 5,425 billion to Indonesia's GDP while the big enterprise contributed 42.92% or around 4,078 billion to GDP (BPS, 2015). One sector that contributes to GDP is the creative industry. Based on the Creative Economy Agency (Bekraf) (2017), the creative industry contributes around 922.59 trillion or 7.44% of the total Indonesian GDP in 2016. The fashion sector produces an added value of 166,135.3 and or contribute 18.01 percent to the formation of Creative Economy GDP.

Nowdays, mostly business organization using the business analytics and data science to explore how they can use the available data (Hindle & Vidgen, 2018; Vidgen, Shaw, and Grant, 2017; Davenport & Harris, 2007) because they want to have accurate information from the data in decision-making process (Iqbal et al., 2018) to create strategy, value, and competitive advantage in their businesses. Business

analytics is a set of methods that convert raw data into action by generating insights for decision making within an organization (Liberatore & Luo, 2010).

One of the industries that are defined by data analytics is retail and 62 percent of respondents in retail feel that the information and analytics give them competitive advantages (Matthews, 2018). Now, analytical data is applied in all stages of retail processes such as find out what's popular by predicting trends, estimating where demand for these products, optimizing prices for competitive advantages, identifying customers who might become interested and looking for how to approach them effectively and finding out what will be sold next (Marr, 2015).

Current research seeks to answer the following question: how do organizations achieve their business goals and competitive advantage by developing business analytical skills? To support this research, we use a research framework that aims to develop and apply predictive analytics using the business analysis methodology (BAM) and Linking Model to identify what kind of the data that they need.

In the creation of strategy, value, and competitive advantage requires an understanding of the business

itself and where analytics will be applied. BAM is one of the approaches that we use to understand a business organization. The BAM approach used in this research is the same as the research conducted by Hindle & Vidgen (2018) which uses the business model canvas (BMC) (Osterwalder and Peigneur, 2010) which is combined with problem situation structuring and business modeling from Soft System Methodology (SSM) (Checkland, 1981; Checkland & Scholes, 1990; Wilson, 1984) namely CATWOE Analysis.

After analyze the business situation, the next is to identify what kind of the data that they need using Linking Model. Linking Model developed by Pape (2016) that separated business analysis into four hierarchial. This method help the company to find the data that will be useful and valueable to get competitive advantage and achieve their goals

## 2 LITERATURE STUDY

### 2.1 Business Analytics

Analytics is used to find, explore, describe, and communicate patterns or trends in data and produce information that is known from data sources (Starkey & Schniederjans, 2014). While business analytics is an advanced stage where information that has been obtained through analytic is used to develop or improve business performance. Business analytics plays an important role in a business organization in creating strategies for competitive advantage and making decisions. (Liberatore & Luo, 2010; Starkey & Schniederjans, 2014).

The application of business analytics for enhance the decision-making process such as to increasing customer profitability, risk reduction, human resource decision, business performance tracking, etc. Furthermore, business analysis can be a strategy for competitive advantage such as price leadership, sustainability, service effectiveness, etc.

### 2.2 Business Analytics Methodology

Business Analytics Methodology (BAM) (Hindle & Vidgen, 2018) is an approach that supports an organization to get value from business analytics starting from initial thinking to getting complete analysis results. BAM is also a process of business understanding to explore the business goals and conditions of a business organization which is then analyzed to find and determine parts of businesses that require analytics.

Basically BAM has two interrelated work streams namely top-down analysis and bottom-up analysis. Top-down analysis is a process that focuses on the business model of an organization to develop business analytics. While the bottom-up analysis does analytics on data.

This BAM approach combines business model canvas (BMC) (Osterwalder and Peigneur, 2010) problem situation structuring and business modeling from SSM (Checkland, 1981; Checkland & Scholes, 1990) namely CATWOE Analysis. dalam melakukan top-down analysis to structure, map, and develop business models.

The application of BAM involves four activities (Hindle & Vidgen, 2018) namely, problem situation structuring, business model mapping, business analytics leverage, and analytics implementation.

1. Problem situation structuring: in this stage the rich picture used to see how the business model function as a whole and the world view from various stakeholder becomes clear.
2. Business model mapping: this stage uses a Business Model Canvas (BMC) supported by Soft System Method (SSM) to map business models. The CATWOE (Clients, Actors, Weltanschauung, Owners, and Environment) Analysis technique is SSM tool and also used to describe the root definition. Then, the root definition from the CATWOE Analysis can open the opportunity for a business model innovation.
3. Business analytics leverage: The BMC, SSM, and CATWOE generated in previous stages used to identify leverage point and opportunities for business analytics that is to identify data, tools, and analysis that are most likely to address business objectives and make the best utilizing scarce resources.
4. Analytics Implementation: in this stages data is collected and build the models and deployed.

### 2.3 Linking Model

Besides using BAM in business analytics, to develop business analytics capabilities start from the first step in business analytics process that finds the type of data that will be useful and valuable for the organization to get a competitive advantage and achieve their goals. In accordance with Pape (2006) who states that to gain insight, business functions in an organization must collect data items regularly to analyse their activities. Linking model by Pape

(2016) is an approach that separated business analysis into four hierarchical layers:

1. Process map: divides business function into value streams
2. Decision: gather core questions where business functions must be prepared to provide answers, establish each decision for a process, and ensure that the list of decisions considers all relevant business activities.
3. Analysis: analytic and metric models, which are relevant for certain business functions
4. Data items: the raw data (numerical and qualitative) required for conducting the analyses.

### 3 METHODOLOGY

In business analytics capabilities, this study uses a qualitative research method to get a deeper level of understanding of everything in a business organization by conducting interviews, observations, and using flipcharts.

The pilot study involved the development of an analytics strategy for the NAH Project. NAH Project is one of the local brand sneakers from Bandung which initially provided products in the form of apparel & skate shoes. The founder and co-founder of NAH Project saw the opportunity that local sneakers needed new innovations to change the stigma that Indonesian sneakers had quality & designs that were able to compete. With a new goal, presenting sneakers products made with research & development that is relevant to the needs of the Indonesian market with guaranteed quality. Their vision is to become "Indonesian cultist sneakers brand who dominates sneakers market through innovation and breakthrough". NAH Project has several divisions in it, namely customer service, billing and operational, sales and marketing, research and development, and creative marketing.

We have conducted interviews with the founder and co-founder to find out overall about the company, and what problems are being faced from their view. In addition, we also interviewed each division also using flip charts as media for each division to write down the current business processes, constraints, and strategies in the future. The process took about three and a half hours for five divisions.

The analysis process using the business analytics methodology (BAM) approach starts from problem situation structuring using a rich picture which is

NAH Project and we should be figuring out all factors that influence the business objectives of NAH Project. Afterwards, we conduct existing condition analysis about NAH Project using Business Model Canvas (BMC), Softs System Method (SSM) especially CATWOE to get information about the root definition of the relevant purposeful activity system. From this process we conclude several business problems that occur in the organization.

Last, the Linking Model is conducted by analysing the business process to get the value stream, then analysing all about the decision in the value stream, the decision will have the analysis before making the decision, and then analysing what type of the data that used to make an analysis to make a decision.

## 4 FINDINGS

### 4.1 Problem Situation Structuring

NAH Project has several divisions, namely customer service, billing and operational, sales and marketing, research and development, and creative. While other divisions such as production, shipping and quality control are held by third parties, namely PTS.sc. The results of the interview with the founder of NAH Project, he feels that his company is known as a company that only sells local shoes at low prices. In fact, he wants his company to be known and valued as a company that provides local products of the highest quality and full of innovation at an affordable price.

Based on Figure 1. the key feature of rich picture is "more than cheap local sneakers" as desired by the founder. The business goals of the NAH Project is to become "Indonesia cultist sneakers that dominates the sneakers market through innovation and breakthrough" to transform the stigma of low quality local sneakers into local sneakers that have quality and design that can compete with branded sneakers. However, in the course of the NAH Project there are several constraints in value creation, customer satisfaction, and customer loyalty. In the future the people trends, need, desire, and expectation will change, so NAH Project need innovation and breakthroughs that meet with the customer expectation to keep the company going, and maintain the revenue by keep selling the product.



products that can compete with branded sneakers but still at affordable prices. To do this they have founders and investors who will decide to make changes, terminate the project, or choose whether to continue the changes. Furthermore, there are also external factors that affect the government policy, national and regional economy, Indonesia factory capability, media, community, trend, and technology.

Table 1: CATWOE Analysis of the NAH Project.

CATWOE	Application to NAH Project
Customer (who benefits/disbenefits?)	People who'd love sneakers, and would like to find an alternative in trying local sneakers
Actor (who perform the NAH?)	NAH Project's team, investor, and third-party
Transformation (what is the NAH?)	To change the local brand sneakers image through bringing an innovation and technology apply
Weltanschauung (what makes the NAH meaningful?)	Local brand sneakers that can compete with branded sneakers with affordable price
(who Owners can stop the NAH?)	Founder and investor
Environmental Constraints (what aspects affect the business unit)	Government policy, National and regional economy, Indonesia factory capability, media, community, trend, and technology

According to Table 1., the root definition constructed for the NAH Project is: "NAH Project change local brand sneakers image in the community by innovation and technology apply in order to be local brand sneakers that can compete with branded sneakers at an affordable price".

### 4.3 Linking Model

Based on the business analytics process by Schniederjans (2014), the first step in the business analytics process is the database. Linking model is used to find the type of data that NAH Project should

collect before analysed and used the insight for decision-making. Linking model is the approach by Pape (2006) that divides the business analysis into four layers (process maps, decisions, analysis, and data items). In this case, the author chooses a key activity and customer relationship from the NAH Project, because both of these are core processes that are in the NAH Project.

From the analysis there are four value stream (VS) namely, concept to development (VS1), content creation to publication (VS2), and order to cash (VS3), and customer relationship (VS4). Each value stream has a process in it. There are 11 process map (PM) namely, Product Design (PM1), Production (PM2), Pricing (PM3), Content Creation (PM4), Publication (PM5), Order Process (PM6), Order and Payment Verification (PM7), Resolving Customer Problems (PM8), Warranty Process (PM9), Conversation (PM9), and Educating (PM10) (See Figure 3).

In the decision stage, based on the process map this research gathers core questions where the business function must be prepared to provide answers to making a decision. This research conducts interviews with each NAH Project division that deals with the value stream to find out what decisions they make. There are 63 decisions which separated by process map.

In making a decision need some analysis that supports a decision. Based on the core questions that must be answered by each division, this research also collects 42 of analysis carried out by each division to answer all the core questions. To do the analysis, data that can be supported is needed. In this research 34 data were obtained (Table 2) required by the NAH Project. These data can be either numerical or qualitative data that can be collected by each business function.

## 5 CONCLUSIONS

NAH Project has a business goals to become "Indonesian cultist sneakers, who dominate the sneakers market through innovation and breakthrough" and they have root definition as "NAH Project change local brand sneakers image in community by innovation and technology apply in

Table 2: Data items.

No	Data
1	Product history
2	Number of order
3	Inventory
4	Sales
5	Customer preference
6	Target segment information
7	Economic condition
8	Technology condition
9	Customer complaint
10	Customer question
11	Social media usage
12	Customer activity
13	Customer interest
14	Customer opinion
15	Social traffic
16	Customer information
17	Customer payment information
18	Trending topic
19	Competitor's product
20	Competitor's product price
21	Competitor's information
22	Competitor's offer
23	Competitor's interaction process with customer
24	Production capacity
25	Employee performance
26	Website traffic
27	Order and payment processing capacity
28	Number of customer questions
29	Number of questions resolved
30	Number of damaged items
31	Number of items has been repaired
32	Solution of complaint
33	Financial data
34	Number of customer response

order to be local brand sneakers that can compete with branded sneakers at affordable price". But based

on the results of the analysis it was found that the current business process has not been maximized in terms of innovation. First, in the R&D division, they only redesigned shoes given by third parties (PTS.sc). They feel confused in designing because there is no clarity about the value of what will be delivered in the new product and the lack of art direction about how new products will be made. Second, the unclear value of what is to be conveyed is due to the absence of market research that causes a lack of information on customer needs that should be done before. Information about market needs will greatly help R&D in developing products. Third, in the Customer Services division, they have the desire to provide the best service for customers by providing same day service, and have a freight system that can carry more than one shoe size so customers can try on their shoes first and choose the right shoe size. They have also collected data about customers to help them determine which areas are potential for them to have a branch or warehouse, but that is still very limited at this time. Based on all three problems mentioned earlier, the main focus to achieve their business goals to become Indonesia cultist sneakers is in R&D because to keep the business on going and get revenue, the R&D capabilities must increase to keep the product selling and meet the customer expectation.

## REFERENCES

- Badan Ekonomi Kreatif. 2017. *Laporan PDB Ekonomi Kreatif Tahun 2014-2016*. Badan Pusat Statistik. [http://www.bekraf.go.id/downloadable/pdf\\_file/180278-pdb.pdf](http://www.bekraf.go.id/downloadable/pdf_file/180278-pdb.pdf). October 28, 2018.
- Badan Pusat Statistik (BPS). 2015. *Perkembangan Data Usaha Mikro, Kecil, Menengah (UMKM) dan Usaha Besar (UB) Tahun 2012-2017*. Kementerian Koperasi dan Usaha Kecil dan Menengah Republik Indonesia. <http://www.depkop.go.id/berita-informasi/data-informasi/data-umkm/>. October 28, 2018.
- Checkland, P. 1981. *Systems thinking, systems practice*. Chichester: Wiley.
- Checkland, P., & Holwell, S. 1990. Action research: Its nature and validity. *Systemic Practice and Action Research*, 11, 9–21. doi: 10.1023/A:1022908820784
- Davenport, T. H. & Harris, J. G. 2007. *Competing on analytics: The new science of winning*. Boston: Harvard Business Press.
- Hindle, G. A., and Vidgen, R. 2018. "Developing a business analytics methodology: A case study in the foodbank

- sector". *European Journal of Operational Research*, Vol.268, pp. 836-851.
- Iqbal, M., et al. (2018). A Study of Big Data for Business Growth in SMEs: Opportunity and Challenges. *International Conference on Computing, Mathematics and Engineering Technology*. Sukkur, Pakistan.
- Liberatore, M. J., & Luo, W. 2010. *The Analytics movement: Implications for operations research*. *Interfaces*, 40 (4), 313–324.
- Marr, B. 2015. *Big Data: A game Changer in The Retail Sector*. Forbes. <https://www.forbes.com/sites/bernardmarr/2015/11/10/big-data-a-game-changer-in-the-retailsector/#33e953fb9f37>. Accessed October 28, 2018.
- Matthews, K. 2018. *5 Industries Becoming Defined by Big Data and Analytics*. Toward Data Science. <https://towardsdatascience.com/5-industries-becoming-defined-by-big-data-and-analytics-e3e8cc0c0cf> . Accessed October 28, 2018.
- Osterwalder, A., Pigneur, Y. 2010. *Business model generation*. Hoboken, NJ: John Wiley and Sons, Inc.
- Pape, T. 2016. "Prioritising Data Items for Business Analytics: Framework and Application to Human Resource". *European Journal of Operation Research*, Vol. 252, pp.687-698.
- Schniederjans, M. Schniederjans, D, and Starkey, C. 2014. *Business Analytics Principles, Concepts, and Applications*. Pearson Education, Inc. Upper Saddle River, New Jersey 07458.
- Vidgen, R., Shaw, S., & Grant, D. 2017. Management challenges in creating value from business analytics. *European Journal of Operational Research*, 261 (2), 626–639. doi: 10.1016/j.ejor.2017.02.023 .