Big Data & Analytics for Business

Editors:

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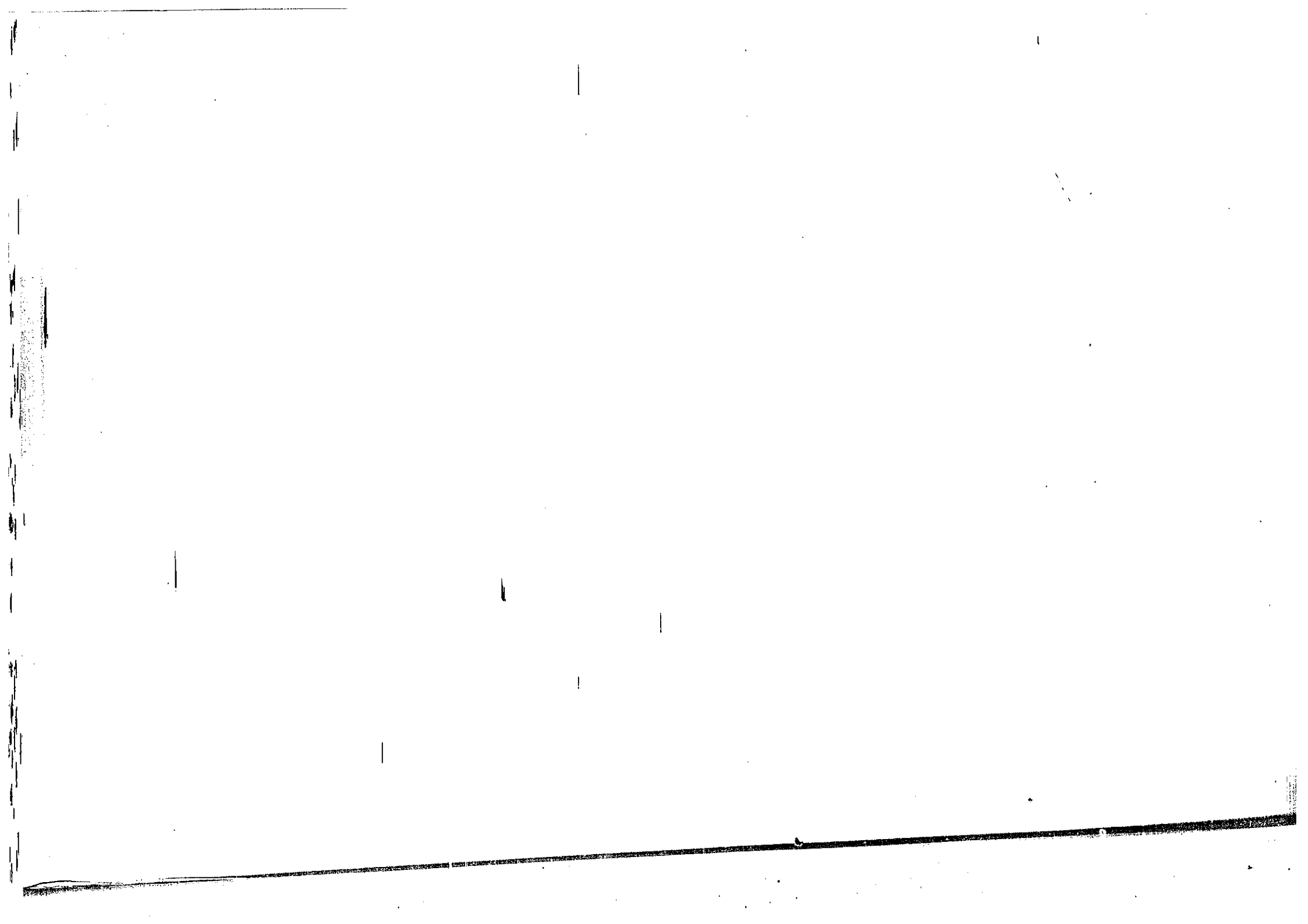
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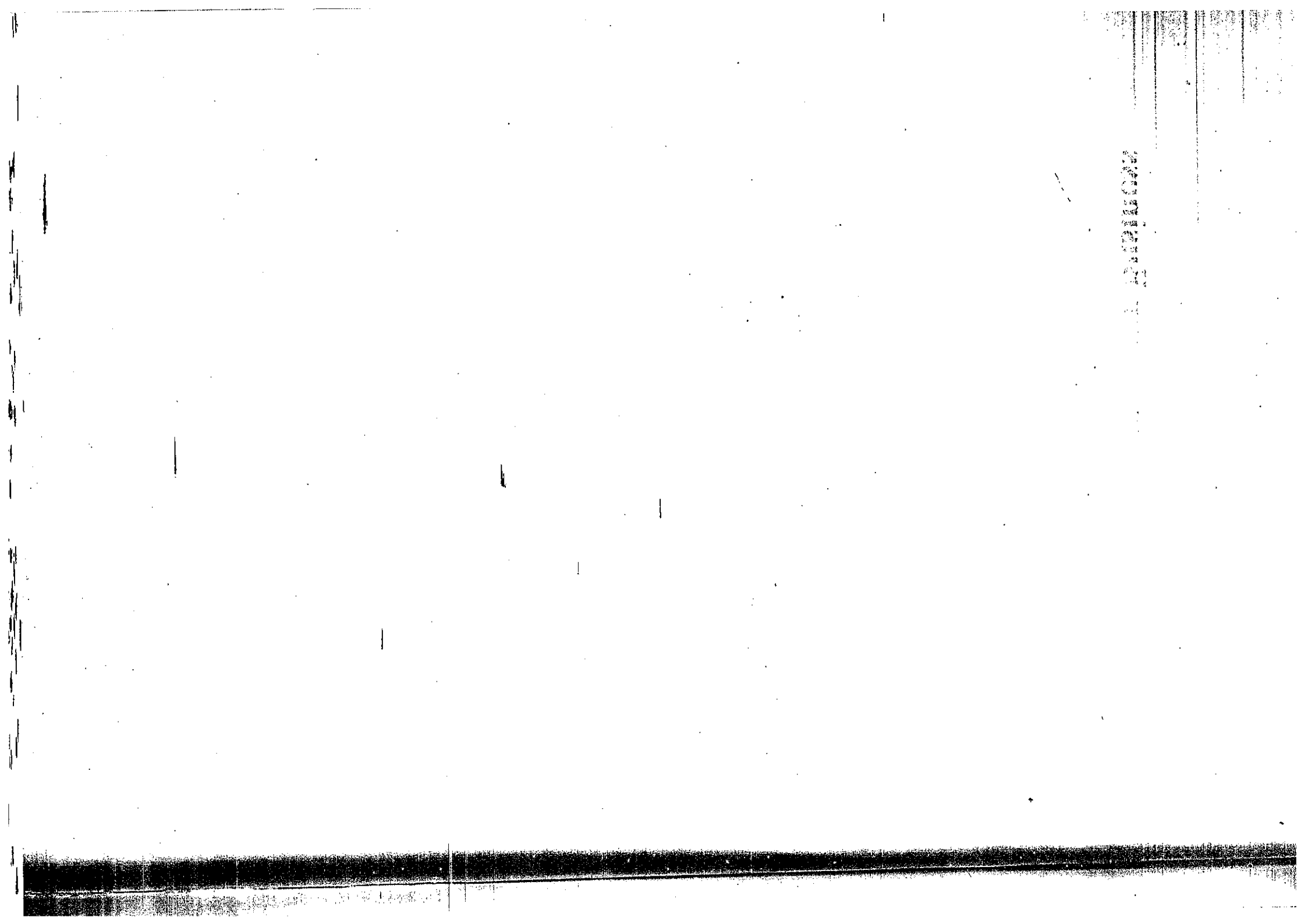
Big Data and Analytics for Business

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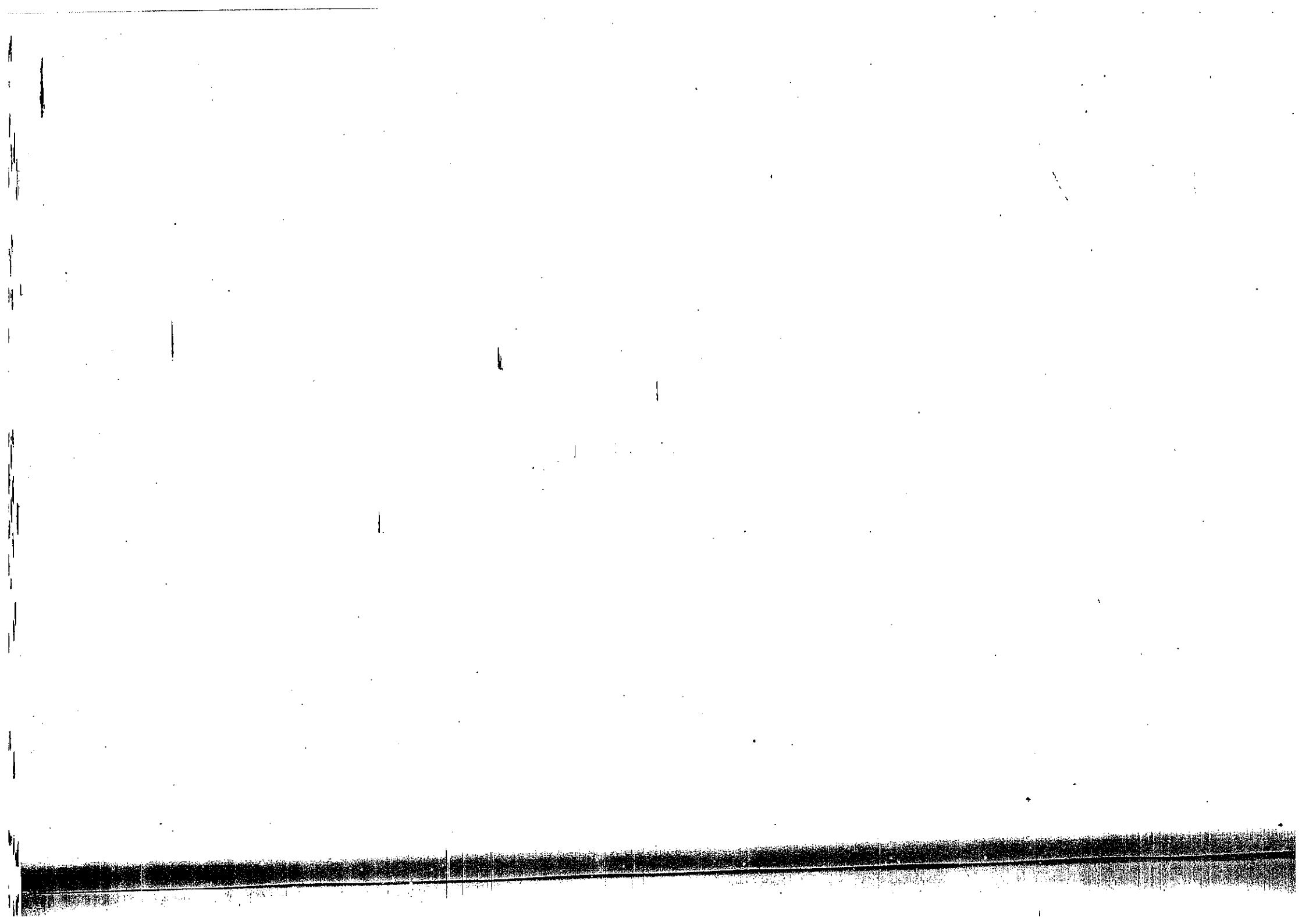prof.vikaskumar@gmail.com

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Preface

Data analytics is critical to businesses. As the small data transforms into 'Big' data, traditional mechanisms and IT infrastructure used to support, analyze and make meaningful interpretations become ill suited. This also brings up numerous management issues. For example, IT experts have the responsibility to map organization-wide data by breaking down organizational silos and building an enterprise-wide IT infrastructure for data analytics purposes. This in fact requires next-generation analytical tools and techniques and brings up new challenges related to issues such as smart data distribution, quick response in the event of grid failure, etc.

Enterprises are increasingly looking to find actionable insights into their data. Many big data projects originate from the need to answer specific business questions, while many of them are dedicated to look forward to the future directions. With the right big data analytics platforms in place, an enterprise can boost sales, increase efficiency, and improve operations, customer service and risk management. For most organizations, big data analysis is a challenge in terms of 3Vs (volume, variety and velocity). These are the three defining properties or dimensions of big data. Volume refers to the amount of data, variety refers to the number of types of data and velocity refers to the speed of data processing. According to the 3Vs model, the challenges of big data management result from the expansion of all three properties, rather than just the volume alone - the sheer amount of data to be managed.

Consider the sheer volume of data and the many different formats of the data (both structured and unstructured data) collected across the organizations and the many different ways and categories of data that can be combined, contrasted and analyzed to find patterns and other useful information. The first challenge is in breaking down data silos to access all data an organization stores in different places and often in different systems. A second big data challenge is in creating platforms that can pull in unstructured data as easily as structured data. This massive volume of data is typically so large that it's difficult to process using traditional database and software methods. The present book volume is at attempt to consider the various technical challenges and the business opportunities in the area of Big Data and Analytics. The emphasis is not only on the theory, but also to see the best industry practices in the domain.

The first section on *"Big Data Management"* has papers related to the data management and has incorporated the databases, servers and other hardware. Chapters on Big Data Management for SMEs, NoSQL and Machine Learning specially highlight the need and scope for the adoption of Big Data analytics for the tomorrow's business. Papers on Graph Databases and Apache Server systems present the technological aspects of new models for Big Data Management.

The second section on *"Business Analytics"* has the chapters on Hadoop Map Reduce and Big Data for Machine Learning Tool in Business Analytics. The chapter on Financial Sustainability Analysis discusses the adoption of Analytics in the private university in Indonesia from sustainability perspective.

The third section on *"Cloud Computing"* has chapters on Data Intensive Cloud Computing and suggest the ways in which organisations can optimize the resources. The chapter on Cloud Application for Mobile Battery Efficiency presents new technical area for the businesses.

The fourth section on *"Data Mining"* discusses the role of data mining in the Social Media analysis. Whereas the chapter on the Data mining by university in Indonesia for marketing promotion strategy discusses the importance of analytics in academic world.

The fifth section on "Decision Support" discusses the topics of data science and data intelligence. Technical methods of decision support have been discussed while the business related decision science has also been supplemented in this section.

The sixth section on "e-Business " comprises of Consumer Behaviour studies in the Indian and Indonesian scenarios. Different data analysis tools and methodologies have been demonstrated by the authors. The section presents a good understanding of the research techniques being used by the young researchers in academic as well as industrial perspective.

The seventh section on *"Enterprise Resource Planning"* has good papers related to the information technology applications in the small and medium scale enterprises. Interesting empirical evidences has been presented from India and Indonesia.

We have taken due care in selection of the quality submissions, their review and aligning them to the central theme of the book. The sub-themes have been selected in a way that the book would provide the topic specific information and knowledge to the readers. We sincerely hope that this edited book shall provide a comprehensive and structured view of different aspects of business analytics to the researchers, students, practitioners and the strategists from the corporate. The discussions from both the technical and business backgrounds will serve as a good reference to the readers.

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THE FINANCIAL SUSTAINABILITY ANALYSIS OF PRIVATE UNIVERSITY IN SURABAYA

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ABSTRACT

Nowadays, the management sustainability of private university is highly depending on the students' funding. It demands the university in Surabaya to competein creating values to the student. The value creation happens when student get the higher education 'squality service benefits, reputation benefits, and also the reasonable tuition fee that has to be paid by the student as the price offered from the higher education. Students' value creation is measured by the active students' perception from each universities. The University quality service is measured by eight indicators, University reputation is measured by seven indicators, the price offered from university is measured by three indicators, students' satisfaction is measured by four indicators, students' loyalty is measured by three indicators, and the university financial sustainability is measured by four indicators. The research data analysis is done descriptively and causal by using SEM, and SPSS-13 program package and so SMART PLS. This research uses 511 students as the respondents from four difference private universities in Surabaya, Indonesia. The result of this research shows that the students value creation positively affect the students' satisfaction and students' satisfaction positively affect their loyalty as well as the financial sustainability of the university. The students' loyalty also becomes mediation between students' satisfaction and university financial sustainability. The meaningful path from this research are the value creation to students' satisfaction then to students' loyalty, and finally to the financial sustainability.

Key words: Value Creation, Satisfaction, Students' Loyalty, Financial Sustainability.

1. Introduction

The massive number of Universities in Indonesia causes an increasing demand of quality service from the society. Quality service will cause a high cost of education, it become a trigger for the university to focus on student satisfaction as one of the main elements to influence the sustainability (Kotler and Fox, 1995). There is a new phenomenon in education field, it said that businessman come together to establish university and give a new color in the competition. It is undeniable that Universities from other countries have big opportunity to open their campus in Indonesia as long as they collaborate with the Universities in Indonesia. This fact becomes a challenge for the private universities which generally rely their financial on the students' funding. The high tuition fee must guarantee the quality service and it must be sustainable. It consist of the increasing of student benefit given by the university, the decreasing of tuition fee, and the increasing of education cost. The increasing of education cost might be happen because the Universities compete to give benefit for their student in order to maintain as well as increase the student intake. Student satisfaction takes an important role to determine the student benefit given by the university. University would prefer the benefits that trigger student satisfaction, and in the other hand reduce benefits that are less able to trigger student satisfaction.

University must be able to give three benefits to the student, which are reputation benefit, service benefit, and product benefit, (Best, 2013). Reputation is one of the most important dimensions for university image positioning, (Gray, BI.,Fam, KS., Llanes, V.A. 2003). Furthermore, reputation is highly suggested rather than the branding effort since reputation is natural thing and it is build in long time period (Nicolescu: 2009). Meanwhile, product benefit and service benefit are the benefits which cannot be separated from education service, thus product benefit become part of other benefits(Ciernes, 2008). Quality service is the main indicator to measure how far the

university has give the service benefit to the student. Quality service is the difference between students expectation and their experience (Parasuraman, A., Zeithaml, V. A., and L.L Berry. 1991). The lowest difference number between expectation and experience, the highest quality service given to the student. It is highly needed to measure the student perception about the quality service in order to measure the service benefit.

Customer value is analyzed through consumer perception about the benefits they receive compare to their perception about the cost they expend-to get the benefits, (Valkunthavasan, 2011). Student value creation may positively effect to their satisfaction and loyalty, (Ti Bei andChingChiao, 2001). Education globalization change the students' behavior and demand toward the service they received. University uses the customer-oriented philosophy to deliver the education service (Kotler and Fox, 1995). The customer-oriented philosophy emphasize on the importance to understand students' wants and needs so that University may meet the students' expectation or even beyond the expectation. The customer-oriented philosophy would help university to satisfy the students as well as grow their loyalty in order to guarantee the university financial sustainability. This philosophy also create new way of thingking to the university management to build competitiveness among universities. According to the student value is the difference between the benefits compare to the tuition fee they expend (Best, 2013).

Quality service has significant influence toward loyalty through satisfaction, meanwhile quality product and reasonable price only have direct and indirect influence through satisfaction toward loyalty, (Lien and Yu, 2001). Customer perception positively affect the financial performance, meanwhile customer loyalty positively and significantly affect the organization financial performace, and customer satisfaction consistently affect the customer buying behavior, (Liang, C., Wen-Hun, W., and Jillian, D.F. 2009)

2. Literature Review

Student Value Creation

The effective marketing teory and concept applied in University may gradually help the university to has competitive advantage (Hemsley-Brown and Oplatka, 2006). The competitive advantage may happen if the university is able to provide difference value to the student compare to the competitors. The process of value creation to the student becomes the key to determine the successful in the competition among competitive universities. The measurement that determines student value given by the university must be seen from student perspective. University has to be sensitive to know the students' wants and needs in order to create student value. Lots of researchers use different definition and concept about value creation. Some terms are commonly used in literature such as customer value, perceived value, and superior value. Zeithaml, (1988) define the value given to the student with Value is what I get for what I give. University can be said has given the value if the student can get more benefits rather than other universities with the same number of tuition fee. The more benefits can be the books, moduls, laptop facilities, almamater suit, study ekscursion, and so on. Value creation is currently become the policy and has been applied in most Universities (Sakthivel, Raju, 2006). University uses value creation as a strategy to understand the students as well as a strategy to use its' human resource to be student benefit oriented. Student value creation shows the importance of interaction process between students and university so that the students get higher appreciation rather than university which does not use value creation (Gromross, 2008). Five steps in value creation implementation process are as follows (Best, 2013):

a) Do the customer analysis which related to how to understand what students like, their life style, and their behavior.

b) Do competitor analysis to identify the University's position in giving benefits and tuition fee decision.

c) Increase the benefits given to the students in terms of quality service and reputation for the students.

d) Set the reasonable tuition fee

e) Do the effectiveness of education cost to fulfill the cash flow that is needed for the University sustainability.

University Quality Service

University which is able to create value for its student has opportunity to increase higher tuition fee. The failure in creating value happens when university only focuses on benefit increasing and less focuses on reasonable tuition fee settlement. There are two benefits that can be given to the students which are quality service and reputation. Student perception towards quality service benefits must be higher than the tuition fee that they need to pay so that the student value will be happen (Best, 2013). The process to create value to the student needs the involvement between university and the students (Gronroos and Ravald, 2010). Value creation process has two sides which are for students and also for the university, and the value for students comes first (Gupta and Lehman, 2005). Eventhough there is no fix model and generally accepted in value creation process (Fernández-Sánchez R., M. Angelesiniesta-Bonillo, Walesska Schlesinger-Diaz, Pilar Rivera-Torres , 2010), value creation is still essential to build university competitiveness. Knowing students' reason in choosing university and the department is very essential to develop University's "positioning" (Maringe, 2006).

University must be able to give three benefits to the students which are reputation benefit, service benefit, and product benefits (Best, 2013). Product benefit and service benefits are the benefits which cannot be separated from education industry, thus the product benefit is a part of service benefit (Ciernes, 2008). Furthermore, service benefit is the most essential thing for educational organization (Oldfield and Baron, 2000; Solomon, M. R., Surprenant, C., Czepiel, and Gutman, E.G., 1985). Quality is not easy to be explained, it is an abstract concept and hard to define (Lagrosen, S.,Hashemi, R.S., Leitner, M., 2004), because of that measuring quality service is not an easy thing to do. Eventough the definition of quality is so various since it depends on customer perspective, but to comprehend students perception through what they feel is an essential dimention in understanding the definition of quality (Ciernes, 2008). Students' perceived quality can be defined as their judgement upon their whole experiences while they have been through in the university (Zeithamel, 1988). Most quality service dimentions are based on students' perception, thus the one who can take role as the determiner in the dimention that is going to be used to measure the quality service is students not the decision makers in University. Based on the similarity on its characteristic, then 30 attributes quality service are specified in to some dimentions, which are: Tangibles, Competence, Content, Delivery, and Reliability. Reliability is the university's ability to offer the service accurately and trustworthy as what they have promised (Parasuraman, A., Zeithaml, V. A., and L.L. Berry. 1991). As the consequence, realibility can create trust upon the University since the university has fulfill its' promise and give its' best for the students (Gronroos, 2008). In the other hand Ghobadian (1994) define reliability as University's ability to give the service precisely and on time as has been promised before. If it has been done, then the university can be said as reliable, accurate, and satisfying. Based on those definitions, can be sumerised that lecturer's reliability will create students' trust, since the reliability is much related to the lecturer's objective judgement on students' achievement, lecturer's ability to solve students' problems, and also lecturer's ability to always fulfill his promises.

University Reputation

Reputation is the main factor in the process of student value creation. Furthermore, image and reputation of a university mostly considered more important that the quality which related to the students (Kotler and Fox, 1995). Le Blanc and Ngunyen (1997) admit that reputation of an university is one of the factors that can help university development to give service and good impression toward the university itself. Impression toward university becomes the University's whole impression and it is created by public judgement. Good impression will increase the

University's reputation. Moreover, reputation becomes one main dimentions for university in their branding process (Gray, BJ.,Fam, KS., Llanes, V.A. 2003). This can influence the potential students to choose their university, (Kotler and Fox, 1995). Yavas andShemwell(1996), Landrum, R., L. Gronholdt, J. Eskildsen, K Kristensen (1999), agreed that an education institutional needs to maintain and develop different impression in order to create competitiveness. Impression and reputation are the main factorin influencing students to choose their university. Those two things are also influence the university itself to do research contrac and development to many parties.

Reasonable Tuition Fee

Price is another component to be considered in the process of value creation. A policy to decide a right price is needed in the tight business competition (Kent, 1992). Competition among Universities forces the university to be careful in deciding tuition fee in order not to be trapped in the university competition circle which is tigher day by day. In creating satisfaction and loyalty, quality service is not enough since students always connect a relation between tuition fee and the benefits they can get (Lee and Cunningham, 1996). Moreover, tuition fee is not onlytake the role as a component in value creaton but also become the determinant in measuring cutomer satisfaction. The lowest tuition fee with students' perception then the more satisfied the student on the university tuition fee (Clemess 2008). Zeithaml (1988) also said the same thing, the smallest sacrifation include tuition fee when they were students, the more satisfied the students toward their university. Tuition fee can be assumed as compensation on the benefits they received. Tuition fee is defined as students' perception on what they sacrified to get university services (Zeithaml, 1998; Lien and Yu, 2001). Tuition fee is amount of money that students have spent to get service and reputation that from university (Monroe, 2003; Kotler and Amstrong, 2010; Hanif, M., Hafeez, S., Riaz, A. 2010).

Student Satisfaction

The fast growing number of university significantly increase the education cost, it triggers the university to think something new about how to satisfy the student in relation to keep its' sustainability (Kotler and Fox, 1995). Student satisfaction might be influenced by university value creation through quality service, reputation, and the reasonable tuition fee. Creating value for student and make the student satisfied are the modern marketing application and thought, it will make the students become loyal (Kotlerand Armstrong, 2010). In marketing literature there are various definitions of satisfaction that can be used in this research. Satisfaction is the positive emotion that is produced from interaction between students and university from time to time (Li-weiandTsung-chi, 2007). Satisfaction on university is the function of students' experiences and reaction upon university's services while they were studying there (Nicholas, J.A.F., G. R. Gilbert, and S. Roslow,1998). Student satisfaction is a positive evaluation where the chosen alternative is at least the same or evenmore beyond the students' expectation (Engel, James F., Roger D. Blackwell, 2001). On the other hand, dissatisfaction occurs when the result does not meet the expectations.

Satisfaction Effect towards Loyalty

University quality service become very essential as a factor to satisfy the students (Browne, B., D. Kaldenberg, W. Browne, and D. Brown,1998). Positive perception of the service given by the university might direct on student satisfaction so that the satisfied students are expected to persuade others through communication (Browne, et al., 1998). The connection between quality service and loyalty has been proven in the researdh done by Boulding, W., A. Kalra, R. Staelin, and V. Zeithaml, 1993and Cronin and Taylor (1992). Loyalty is a student's behavior who wants and willingly to do another purchase (Boulding et al., 1993), meanwhile Cronin and Taylor's research (1992) define loyalty as a behavior to make another purchase as well as recommend others to do so. The same statements also stated by Martensen, A., L. Gronholdt, J. Eskildsen, K. Kristensen,(1999) who said that loyalty can be shown from student willingness to continue his education in the future and also his willingness to recommend his major study from his University to others. Furthermore, Webb andJagun (1997) also stated specifically thata loyalty can be measured by students' willingness to recommend their university to other students, tell positive things

about their university, and that student will also come back again to continue their study. Keeping good and long term relationship between university and students can create competitiveness. Indirect student value creation would influence students' loyalty through satisfaction that they feel. Loyalty and satisfaction have close relationship where satisfaction is the main variable of loyalty creation, (Dick andBasu, 1994).

Loyalty Effect towards Financial Sustainability

Loyalty as a mediaton between customer perception and financial formancebecomes one of the strongest prediction tools in deciding purchase behavior. Student loyalty may guarantee the university'ssurvival. Loyalty makes students survive until they graduate and indirectly influence the financial sustainability. The financial sustainability only happens if the students are loyal to the university. Sustainability happensif the customer satisfies on the value given by the service giver. The positive perception from students would influence the university financial sustainability, (Liang et al., 2009). The same thing also stated byBolton, R.N., Katherine N. Lemon, Peter C. Verhoe, (2004) that an understanding about loyalty concept requires escalation on student value creation which is manifested by the student retention and their willingness to join other activities in the university *(cross-buying)* in order to indirectly influence the financial sustainability. Increasing the quality service and student satisfaction will produce the financial sustainability, (Tang Weiwei, 2007; Shin and Elliot, 2001). Thus nowadays, the biggest aim for most universities is to satisfy their students (Jones andSasser, 1995) since it may influence the profit improvement, words of mouth, and also reduce the marketing cost (Reichheld, 1996; Yeung, M., Ging L., andEnnew, C. 2002). Students are the external stakeholders for University and to help students to indetify and measure the university financial sustainability, they need to find signals that reflect the financial sustainability. To measure the university financial sustainability this research uses the singaling theory which was developed by Brian et al., (2010). Signaling theory is a theory which related to signals that are usefull to describe the behavior when the two sides (students and university) have different information access.

Research Hypothesises

Student value creation can be represented through the perception about the university, its' reputation, and students economic sacrifice while they were studying in the university (Best, 2013). Sumaedi's research, (2011) stated that the quality received by the students and the reasonable tuition fee have positive effects toward students satisfaction. Aga andSafakli, (2007) also did similar research on an accounting company in North Cyprus and summarized that quality service and reasonable price have significant effects toward customer satisfaction. Anderson, et al., (1994) emphasized that price is the influential factor in determining customer satisfaction since anytime customer evaluate the value of the service, generally they will consider on the price. Reputation is also an essential factor in measuring quality signal (Zeithaml, 1988). Satisfaction is positively effected by the perception upon the value named student value (Chen, Dubinsky, 2003, Sakthivel, Raju, 2006, Yang, Peterson, 2004). Value creation on university influence satisfaction which is effected on the students loyalty, (Fernandez, et al., 2010). Student satisfaction on their experiences in the university will create loyalty and words of mouth promotion (KotlerandArmstrong, 2010).

H1 :Value creation form university quality service affects students satisfaction
H2 :Value creation through university reputation affects students satisfaction.
H3: Value creation from reasonable tuition fee affects students satisfaction.
H4 :Students satisfaction affects their loyalty.

H5: Student satisfaction affect the financial sustainability

Increasing student satisfaction may create university financial sustainability (Tang Weiwei, 2007). Shin and Elliot (2001) also stated that through student satisfaction, university may guarantee its financial sustainability

Student loyalty affect the university sustainability while student satisfaction consistently and positively affect the student to choose the university. Loyalty makes students survive until they graduate and indirectly influence the financial sustainability.

H6 :Student loyalty affect the financial sustainability
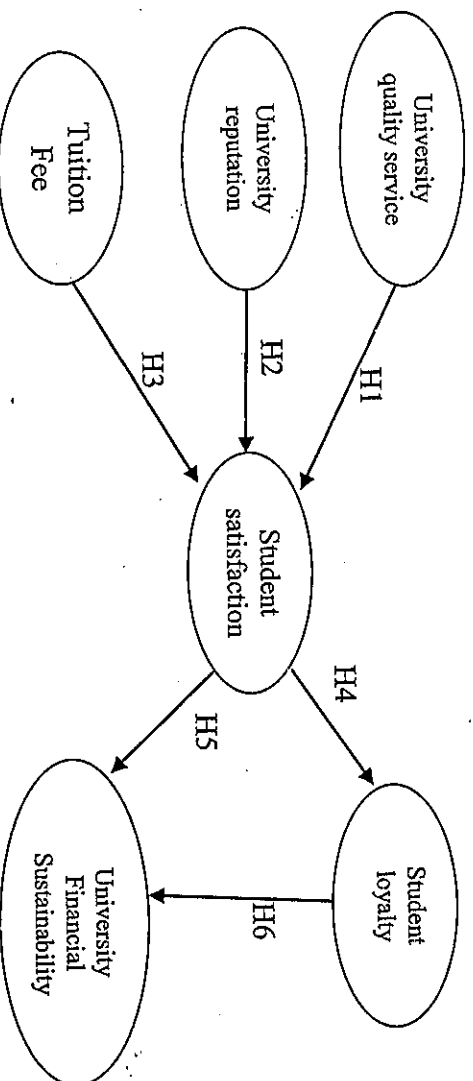
Figure 1: Research Concept

3.   Research Method

This research is a quantitative research and can describe the causal relationship among the researched variables. This source of data is the primary data through a quesionare that was spreaded to the respondents. The respondents are active students from four private universities in Surabaya. The research analysis model use SEM Model approach. Population is all the private universities which categorized as the universities with the highest tuition fee in Surabaya. Samples are the four chosen private university, and respondents are the chosen students from those four universities. The respondents are chosen by using *non-probability sampling* with *purpose sampling* method. The criterias of the respondents are: active students on the chosen private university and registered in 2013 has been studying at least one year.

The data analysis was done in two steps, first descriptive analysis and second causal analysis. In the descriptive analysis, it used frequency, mean, deviation standard, and varian analysis by using SPSS 13.0. Causal analysis was used to see the effect relationship and hypothesis testing. This analysis used *Structural Equation Model* (SEM). The data analysis in this relationship used *Partial Least Square (PLS)* program, because all the variables are laten and those were measured through indicators. Value creation consists of three dimentions which are: First,university quality service which consists of eight indicators; second university reputation which consists of seven indicators; and third, university tuition fee which consists of three indicators.Student satisfaction consists of four indicators, student loyalty consists of three indicators, and financial sustainability consists of four indicators.

4.   Finding And Analysis

This research is done by using 511 students from four chosen well known universities in Surabaya. The universities are chosen based on the same segments which are tuition fee which more or less the same, student ethnic majority, and most of the students came from the same senior high schools. The samples are taken from the students who are willingly to be interviewed and fill the quesioner.

Respondents' Profile

This research aims to show students perception toward the value given by their university. The students sample come from four universities as seen in the Table 1. It is seen that the student numbers from each universities are different; this caused by the difficulty to find the students who wanted to be interviewed and filled the quesioner. Besides, these numbers also represent the university student number. It shows that UBAYA and Petra Christian University are the universities with the biggest student numbers compare to other universities.

Table 1.Students' Origin University

University Origin	Frequency	Presentage
UBAYA	155	30,3
STTS	68	13,3
Petra C.U.	178	34,8
U Ciputra Surabaya	110	21,5
Total	511	100,0

From the respondents' gender, apparently the male respondents were dominantly chosen, which was 56,95%. However, the female respondents who was 43,05% also considered as big number, thus this information which based on gender can be said as adequate. Perception is commonly different based on the gender. Thus student perception on value creation can be seen from the gender. Based on the GPA, it is seen that these students are also various. It shows that the respondents starts from the students who have good until excellent GPA with 76% percentage. It is assumed that student with the good GPA will tend to give the good responses and vice versa. In this research the students with GPA ≤ 2.60 are 23,87% and the students with GPA >3.0 are 38.55%. From the data, it is also seen that the respondents are dominated with the students who have studied for minimum one until two years with the precentage 61,45%. Besides, it is also found that there are also students who have studied for four years or even more with the precentage 14,48%. The time period shows the intensity of service process that the students have received. It may give positive respond if the service meets the expectation or vice versa.

Research Instrument Validity and Reliability

The instrument validity and reliability are based on the statistic standard number. *Corrected Item-Total Correlation* bigger tan 0.30 and *Cronbach's Alpha* coefisient numberbigger than 0.60.The following data are the research variables, total indicators, minimum and maksimumcoefisient of *Corrected Item-Total Correlation*, as well as *Cronbach's Alpha*coefisient. The information came from early 30 respondents to test the validity and reliability of the instrument measurement.

Table 2.Research Instrument Validity and Reliability

Variables	Total Indicators	Corrected Item-Total Correlation		Cronbach's Alpha
		Minimum	Maksimum	
University Quality Service	8 Indicators	0.361	0.752	0.856
University Reputation	7 Indicators	0.359	0.506	0.655
Tuition Fee	3 Indicators	0.579	0.755	0.912
Student Satisfaction	4 Indicators	0.399	0.516	0.669
Student Loyalty	3 Indicators	0.396	0.714	0.761
University Financial Sustainability	4 Indicators	0.526	0.640	0.770

From the data on Table 2, it can be summarized that all the variable indicators as the research instruments meet the requirement of validity and reliability. It shows that the result of this measuring instrument is valid and reliable. Thus, this instrument can be further used   to   collect   the   research   data.   The   value   of   variables   are measured using this instrument. It is used to 511 students from 4 private universities chosen in Surabaya.

Descriptive Analysis of Research Variables

The result of this research shows that students' perception toward their universities quality services are not special. From scale 1 to 5, the average of the data do not reach 4 score, with the variation of deviation standard between 0.74 – 0.85. This condition shows that students' perceptions toward quality service are various. From 8 indicators, seems that the two indicators that get highest perception value from the students are "Lecturer teach in a good manners" indicator, (M=3.71;DS=0.81) and "Lecturer has adequate knowledge" indicator, (M=3.76:DS=0.80). While the indicators that get lowest students perception are "Lecturer pay attention to students' academic problems" (M=3.43;DS=0.84) and "Lecturer understands students' academic needs", (M=3,44;DS=0.85).

The average of students' perception toward university reputation is 3.5 but still has not meet the 4 score and the deviation standard is in between 0.76 – 0.85. Compare to the university quality service, the average of university reputation is higher but less various. Indicators which have the highest score from students' perception are "People recognize us as a department who has high quality teaching methods" (M=3.82:DS=0.82) and "People recognize us for other students in majority" (M=3.32;DS=0.90), meanwhile the indicator with the lowest perception is "The amount of my tuition fee is related with the service I receive in my department" (M=3.2; DS=0.87). While the indicator with the lowest perception is "People recognize us as a department which has contribution to our city, Surabaya" (M=3.56; DS=0.85).

The average of students perception toward tuition fee is less tan 3.5, with deviation standard is in between 0.82 – 0.90. Compare to the university quality service and reputation, the average of tuition fee is lower and quite various. The indicator of tuition fee which has highest perception is "The amount of tuition fee I spend is acceptable for students in majority" (M=3.32;DS=0.90), meanwhile the indicator with lowest perception is "The amount of my tuition fee is related with the service I receive in my department" (M=3.2; DS=0.87).

The average of students satisfaction is more tan 3.5 but still less tan 4.0, with deviation standard in between 0.79 – 0.90. From four students satisfaction indicators, the indicator which has highest perception is "I am satisfied with the lecturers in my department" (M=3.65; DS=0.82), while the indicator with lowes perception is, "I am satisfied with the service I received since it is equal to my tuition fee" (M=3.5; DS=0.88).

The average of student loyalty is 3.4 in minimum and 3.56 in maksimum with deviation standard in between 0.81 – 0.95. Students loyalty indicator which has highest perception is "I will recommend my department to my friends" (M=3.56; DS=0.91), while the lowest perception is "If I had another change, I would choose my department" (M=3.4; DS=0.95).

Students perception to the university financial sustainability has an average 3.4 in minimum and 3.75 in maksimum with deviation standard in between 0.82 – 0.93. Indicator which has highest perception is, "Student intake in my department always increase" (M=3.75; DS=0.86), while lowest perception is "My department has lots of scholarship from industry" (M=3.4; DS=0.93).

Structural Similarity Analysis

Based on the Table 3, it seems that statistically speaking, the causal relationship from three dimentions of student value creation is significantly positive toward students' satisfaction. It is also shown that quality service has stongesteffect than university reputation and even tuition fee. This statistic testing proves that hypothesis H1 which stated that the quality service of private university affect the students' satisfaction is accepted. Hypothesis H2 which stated that the reputation of private university affect the students' satisfaction is also accepted. Hypothesis 3 which

siated that the tuition fee of private university affect the students' satisfaction is also accepted. The results of this research support the previous researchers, (Dubinsky, 2003; Best, 2013; Aga andSafakli, 2007; Sumaedi, 2011; Valkunthavasan, 2011).It is seen that students satisfaction positively affect the students loyalty or even the university financial sustainability. Students loyalty positively affect the financial sustainability, and might be the mediation that can strengthen the causal relationship between students and university's financial sustainability. The highest satisfaction will make highest loyalty level and push the students and stakeholders' willingness to pay more to the university. The existence of loyalty mediation between students satisfaction and university's financial sustainability in the end strengthen the students' satisfaction effect towards financial sustainability.

Table 3.Path Coefisient and Research Hypothesis Testing

Causal Relationship	Path Coefisient	Dev. Std	T-Statistic	Sig	Hypothesis Testing
REPUTASI -> SATISFACTION	0,203	0,044	4,58	0,000	H1: Accepted
SERVQUAL -> SATISFACTION	0,399	0,039	10,23	0,000	H2: Accepted
PRICE -> SATISFACTION	0,292	0,035	8,28	0,000	H3: Accepted
SATISFACTION -> LOYALTY	0,618	0,031	20,17	0,000	H4: Accepted
SATISFACTION -> KEUANGAN	0,275	0,050	5,501	0,000	H5: Accepted
LOYALTY -> KEUANGAN	0,523	0,037	13,96	0,000	H6: Accepted

Based on the information in Table 4, then can be said that indicators of laten variables are reliable to create structural equation model. Construct validity can be seen from loading factors from each indicators of laten variables is 0.61 minimum, variance extracted (AVE) bigger than 0.5 and Composite Reliability bigger than 0.70. These statistic numbers show that the model used is very reliable.

Table 4.Reliability Data Testing of Structural Equation Model

Laten Variables	Number of Indicators	Loading Factor		Average variance extracted (AVE)	Composite Reliability	R²
		Min	Max			
University Quality Service	8	0.61	0.79	0,54	0,84	-
University Reputation	7	0.61	0.81	0,58	0,88	-
Tuition Fee	3	0.88	0.90	0,79	0,92	-
Student Satisfaction	4	0.71	0,64	0,82	0,485	
Loyalty	3	0.71	0.81	0,57	0,80	.0.382
Financial Sustainability	4	0.61	0,80	0.51	0.80	0.273

Goodness of Fit Model Testing: The model used in this research is believed that can describe the real condition through statistic testing known as *goodnes of fit* (GOF). A good model in PLS is a model which has reliable prediction. The number that can be used in this testing known with Q² score. In this research the Q²score can be found with the following formula:

$$Q^2 = 1 - (1-R_1^2)(1-R_2^2)(1-R_3^2).$$

If Q^2 score close to one, then the model has a good prediction score, and the other way arround. R_1^2, R_2^2 and R_3^2 numbers are determinant coefisient for these three equations:

$$SATISFACTION = 0.203\ REPUTATION + 0.399\ QUALSERV + 0.292\ T.FEE,\ R_1^2 = 0.482 \quad (1)$$

$$LOYALTY = 0.618\ SATISFACTION,\ R_2^2 = 0.382 (2)$$

$$FINANCIAL = 0.523\ LOYALTY + 0.275\ SATISFACTION,\ R_3^2 = 0.273 \quad (3)$$

Based on R_1^2, R_2^2 and R_3^2 scores above, then it brings result to this score:

$$Q^2 = 1 - (1-R_1^2)(1-R_2^2)(1-R_3^2)$$

$$Q^2 = 1 - (1-0.482)(1-0.382)(1-0.273)$$

$$Q^2 = 0.77.$$

$Q^2 = 0.77$, is a quite big score that close to one, thus can be said that this model has high prediction. This model statistically describe the data very well.

5. Conclusions and suggestions

Conclusions

This research analysis has come to some conclusions which as follows:

1. There are positive effects in the dimention of student value creation which are university quality service: university reputation, tuition fee, toward student satisfaction; And the quality service has the strongest effect.

2. Students satisfaction positively affect the students loyalty and university financial sustainability.

3. Students loyalty has positive effect toward financial sustainability and also become a mediation that strengthen the causal relationship between students satisfaction and university financial sustainability.

4. The paths that describe strongest causal effect are university quality service, students satisfaction, students loyalty, and university financial sustainability.

Suggestions

Based on the conclusions above, then here are the following available suggestions:

1. Private university must be able to increase the quality service as one of student value creations, especially to help student in the academic field through lecturer competence and updated courses, and also help students to access the courses in an easy way.

2. Private university through its' department must have a unique competitiveness in order to make a real breakthrough for the students.

3. Loyalty for a university is shown by recommendation to friends or even have planned to use another service in the future. It needs a good communication between the departments and students body and also alumny.

4. Private university needs to have open and transparant communication through facilities that can be accessed by the students. It is used as a proof of their responsibility above the funding, so it can signalling the society about university financial sustainability.

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