KnE Social Sciences

Knowledge E
Engaging minds

Conference Paper

Service Quality of Banking Credit Based on Six-Sigma Method

Ayi Tejaningrum

Sekolah Tinggi Ilmu Ekonomi Ekuitas

Abstract

The purpose of this research is to get information about banking services in lending process, especially from the time aspect, as needed by a consumer in credit application process. The study was conducted in a bank in West Java, with a sample of 61 incidents. The approach used is the Six-Sigma model, where the dispersion value of a data becomes the main basis in process improvement. The research method is the naturalistic quantitative approach, where the symptom of data taken from an event is analyzed by calculation of dispersion value or deviation from symptom center. Some analysis used are: Range, Average Deviation, Standard Deviation and variance. While the process analysis is done using IMR Chart and Process Capability. Based on the results of the analysis of 61 samples, obtained average in accordance with the target company is 6 days, but there are 20 or 33% of data defects or that do not meet the specification limits, with Range 7, Mean 6,000, SE Mean 0.200, Standard Deviation 1.560 and Variance 2.433. Based on this, the company should use dispersion as a performance reference, where the improvement targets instead of lowering the average lowers the dispersion, because the average hides the variance. Therefore, the bank must make an improvement effort so that the credit processing time in accordance with the company's target with a small dispersion.

Keywords: Six Sigma, process variability, and quality of service

Corresponding Author:
Ayi Tejaningrum
ayi.tejaningrum@ekuitas.ac.id

OPEN ACCESS

1. Introduction

The Service sector is currently, dominated by banks, tourism, education and hospitality. The banking industry is of concern to the public, as almost all walks of life relate to this industry, both for savings and credit processes. In Act No. 3 of 2004, the bank is defined as an institution that collects funds from the public in the form of savings and distributes it to the community in the form of credit in order to improve the standard of living of many people. Every banking in Indonesia is given special task by government to distribute credit to society especially to productive activity. In the process of credit distribution, banks must be able to provide services according to

customer expectations and desires. This is due to the sharper competition between banks.

Table 1: Number of commercial banks, rural banks and fund distribution (credit).

	2013	2014	2015	2016	2017
Total Commercial Banks	120	119	118	116	115
Total Rural Banks	1.635	1.643	1636	1633	1.617
Number of Fund distribution by Commercial bank (billion)	4.823.303	5.468.910	5.952.279	6.570.903	7.177.051
Number of Funds Distribution by Rural Bank (billion)	74.550	86.931	98.604	109.389	121.296

Source: Indonesian Banking Statistics – vol. 16, no. 2, January 2018.

Table 1 shows that, currently (December 2017), Indonesia has 115 Commercial Banks and 1,617 Rural Banks, with total funds disbursed amounting to 7, 298, 347 Billion. At a glance we can assume how the banking should be able to provide the best service, so that customers want to do credit transactions to the bank. This study will conduct an analysis of the banking credit services based on Six Sigma method that occurs in one of the Government-owned banks located in West Java. This is based on consumer complaints by the authors of the preliminary survey, stating that many Banks still require a relatively long time in credit process, whereas technology is getting more advanced. In the field of many banks that promote the duration of credit process there are max 6, there is max 7 working days and others, but the fact there are up to 3 months new liquid. On that basis, this research will be focused on banking credit services seen from the aspect of the suitability between promotion and implementation.

2. Literature Review

2.1. Banking and credit concepts

In Indonesia, banks are regulated by Law No. 10 of 1998, in lieu of Law No. 7 of 1992. In the Act, the Bank is a business entity that collects funds from the public in the form of savings and distributes it to the community in the form of credit and / other forms in order to improve the standard of living of many people. Based on the concept, then there are two functions of bifurcation that is collecting funds from the community in the form of savings and redistribute in the form of credit. The meaning of credit is the provision of money or claims that can be equalized, based on a loan agreement or agreement between the bank and another party, which requires the borrower to repay the debt after a certain period of time with the grant of interest.

2.2. Six-Sigma concepts

The main philosophy of the Six Sigma program is 'customer driven companies'. Edo-somwan (1993) defines a company driven by customers and markets as something that promises to provide excellent quality and competitive products and services to satisfy the needs and desires of market segments that have been determined. Six Sigma records, some of the benefits that GE received as a pioneer in the use of Sis Sigma are:

TABLE 2: Benefit of using six-sigma methods at general electric.

Variable	Indicators
Productivity	Increases 12%
Productivity Decrease COPQ (cost of poor quality)	> 84%
Elimination of failure in process	99.7%
Annual growth rate increase	Average 17% in revenue, profits and price equals
Manufacturing cost savings	$11 Billion
Source: Gaspersz (2002).	

Six-sigma is defined as a vision of quality improvement to 3.4 failures per million opportunities, for each product transaction (goods and or services) to zero defect (Gaspersz: 2002). While Pyzdek Thomas (2002) Six Sigma is a business undertaken by companies to reduce process variation to a minimum, so the process consistently meets or exceeds customer expectations and requirements. The six-sigma implementation strategy created by Mikel Harry and Richard Schroeder is called The Six Sigma Breakthrough Strategy. This strategy is a systematic method that uses data collection and statistical analysis to determine sources of variation and ways to eliminate them (Harry and Scroeder, 2000).

Six sigma is a further development of Total Quality Management (TQM), there are significant differences between the two concepts, in TQM using 7 tools with 3 sigma approach, PDCA (Plan-do-Check-Action) becomes a process in planning and quality control. While in Six Sigma use DMAIC concept that is Define-Measure-Analyze-Improve-Control. Pyzdek Thomas (2002) mentions an important point of Six Sigma is a benchmark in assessing product variability; this is included in process capability techniques. Under the assumption of normality, the three-sigma quality level (3σ) is realized in a process that produces 99.73%. Further improvements consider the location of the process as well as its dispersion and tighten the minimum acceptance

criteria so that the process average is at least, four-sigma (4σ) from the nearest, engineering requirements.

2.3. Service-quality concept

The service quality model has long been developed in line with the development of science and technology. Lewis & Booms (1983) is the first expert to define service quality as a measure of how well the level of service delivered is able to match customer expectations. There are two main conditions of the definition of how the level of service and what customer expectations. Several models were developed to identify service quality dimensions, including Parasuraman, Zeithaml and Berry (1985), which mentioned that there are 10 service quality dimensions: Reliability, responsiveness, competence, access, politeness, communication, credibility, security, customer understanding and physical evidence. While Johnston & Silvestro (1990) there are three dimensions of quality: Hygiene Factors, Quality-Etching Factor and Dual-Threshold Factor. Lehtinen & Lehtinen (1991) in Tjiptono and Chandra (2011): proposed two dimensions of service quality: process quality and product quality. Next Gummesson (1987) mentions 4 dimensions of quality: Design quality, Production quality, Delivery Quality and Relationship Quality. Based on the description, the author uses the concept of Parasuraman, Zeithaml and Berry that has been updated, from 10 dimensions to five dimensions of reliability, responsiveness, assurance, empathy, and tangibles. Reliability is related to the ability of the company to provide accurate service from the first without making any mistakes and delivering his services according to the agreed time. Responsiveness relates to employees' willingness and ability to help customers. Assurance deals with employee behavior in growing customer confidence in the company. Empathy ability of company in comprehending problem faced by consumer, and tangible with respect to attraction of company physical facility.

2.4. Product variability concept

The problem of variability becomes something that is frightening in the Industrial world, because variability contains inconsistencies of a product either goods or services. Variability for product quality can be assessed from the following 8 dimensions: performance, feature, reliability, conformance to specifications, durability, serviceability, esthetic, perceived quality. As for the variability of services can be assessed from

the dimensions of service quality that is reliability, responsiveness, assurance, empathy and tangibles (Zeithaml and Berry: 1985). Consistency of the quality dimension results in low consumer satisfaction (Tejaningrum., A.: 2014). Inconsistency is variability

TABLE 3: Formula of variability.

Average Dev $= \sum_{n=1}^{\infty} \left(\dfrac{Xi - \overline{X}}{n} \right)$	Average Deviation: deployment Based on absolute deviation Number against the mean.
Variance $= \sum_{n=1}^{\infty} \left(\dfrac{Xi - \overline{\overline{X}}}{n-1} \right)$	Variance: deployment based the sum of squares of deviate numbers- the number against the mean; See the inequality of a group of data
Standard deviation $= \sqrt{\sum_{k=0}^{n} \dfrac{Xi - \overline{X}}{n-1}}$	Standard Deviation: deployment based on the root of the variance; shows the diversity of data groups
Sources: Tejaningrum Ayi (2007).	

2.5. Research methodology

The population of the study is XYZ bank customer data in Bandung West Java City, which conducts lending transactions in February to March 2018, as many as 61 customers. The research is done by naturalistic quantitative approach, where the research does not make treatment, the data taken is unique, that is based on the view from the data source not the researcher's view. (Sugiyono: 2008). Data analysis using descriptive statistics that calculate the symptoms of central and dispersion.

3. Results and Discussion

3.1. Process variability

The customer or the sample in the credit application process takes process variation from the time deviation required, since the credit requirements are met up to the credit acceptance stage. Data were taken from 61 samples processed during 2 months of service at a bank branch office in Bandung West Java. This bank sets the minimum limit of credit disbursement time, which is promised to the consumer is at least 3 days, max 6 days.

From the data 1 of 61 samples, with the limit of 3 (three) days of credit disbursement specification, max 6 days, there are data outside the specification of 20, with average

TABLE 4: Lead time to acceptance.

Time to Acceptance	Frequency data 1 (before)	Average	Frequency data 2 (After)	Average
3	1	3	0	0
4	9	36	0	0
5	16	80	10	50
6	15	90	41	246
7	9	63	10	70
8	6	48	0	0
9	4	36	0	0
10	1	10	0	0
Average		6		6

Sources: Processed from field data, Bank XYZ (March 2018).

6 days, range 7, SE Mean 0.200 and Standard deviations 2.433 and Variance 2.433. Here are the results if the data using software Minitab 16.
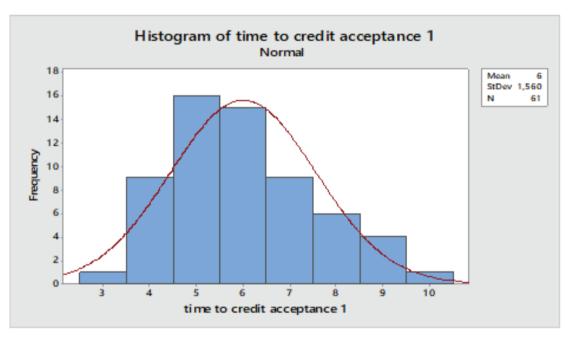

Figure 1: Standard Deviation data 1.

Descriptive Statistics: data 1

```
Variable    N   N*   Mean   SE Mean   StDev   Variance   Minimum     Q1    Median
Q3   Maximum
data 1     61    0  6,000     0,200   1,560      2,433     3,000   5,000    6,000
7,000   10,000


Variable   Range
data 1     7,000
```

If assumed company, make improvements with reference to promise given by consumer, for example from 61 samples obtained data as in Table 1, data 2. Means 6, SE Mean 0.0739, Standard Deviation 0.3333, Variance 0.3333.

Descriptive Statistics: data 2

```
Variable   N  N*    Mean  SE Mean    StDev  Variance  Minimum     Q1  Median
Q3  Maximum
data 2    61   0  6,0000   0,0739   0,5774    0,3333   5,0000  6,0000  6,0000
6,0000   7,0000

Variable    Range
data 2     2,0000
```
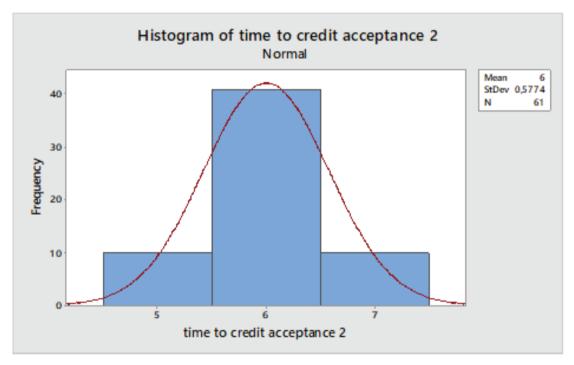

Figure 2: Standard Deviation data 1.

If management only uses the concept of an average to measure a performance, then we will be stuck on the real reality, therefore in the six sigma concept, management must include dispersion either standard deviation, range or standard average or variance. Let us analyze the first data obtained, means 6, standard deviation of 6,000 standard deviation 1.56 and range 7. With the mean of a reference in deciding the fulfillment of criteria, then the value of 6 states the perfect process, but when analyzed from 61 data there are 20 data out of the limit specifications, or 33% of failed products. This condition will certainly provide dissatisfaction for consumers. Therefore the company should not use the average as a reference in the process appraiser. Consider the second data with the same number of samples that is 61 companies

make improvements and got the average value of 6, with standard deviation of 0.577 and range 2, obtained 41 data meet the specification limits. Thus the bank must refer to the deviation from the data or σ either in the range, the standard deviation and variance deviation. Management should focus on efforts to achieve value deviations or variance, so as to maintain service reliability.

3.2. Process analysis

Process capability can be used to assess how high a process meets a predetermined standard; on the data one obtains the process capability as follows:
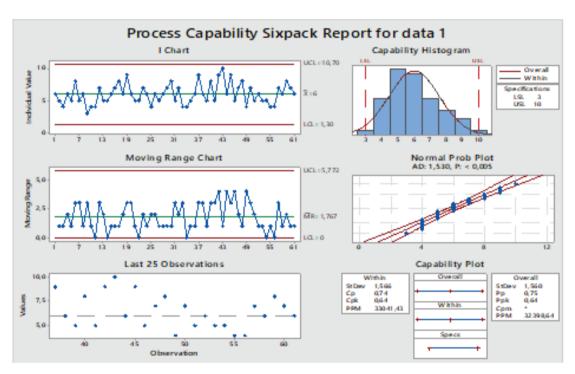

Figure 3: Capability Process data 1 (before).

Figure 3 shows the t process in data 1, there is data distribution, min value 3 and max 10, with a very high range of 7, a condition that indicates poor variability. Based on graph monitoring, IMR (Individual Moving Range) shows out of control symptoms where there are 6 points tend to rise and fall in data 3 till 10. There are more than 8 data always above the midline of 37 till 55. On histogram highly visible spread of wide data, with process capability index: 0.74 and Cpk: 0.64.

In Figure 4, from IMR char appears stable data is in a controlled process, but there is 1 data outside the control limit. With the value of Cp 0.70 and Cpk 0.70 has shown an improvement toward the high process capability. Histograms no longer have a wide spread of data, have started to narrow and fall within the limits of the lower and upper

specifications. The occurrence of process out of control on the data 2, due to the limit of specifications to be max 5, while the data 1 max 10.
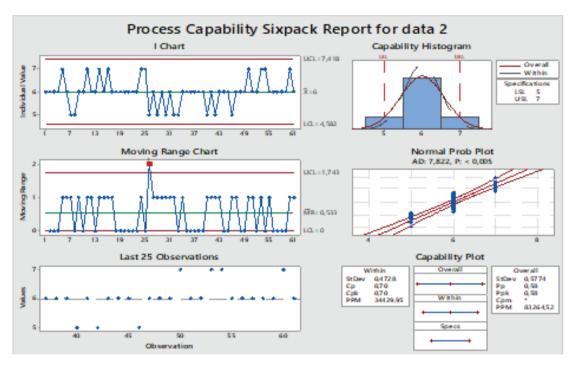

Figure 4: Capability Process data 2 (after).

4. Conclusions and Recommendations

Based on the analysis results show that, in the process of performance measurement should not only use the average as a reference process, because the average will hide the variation. Organizations should try to lower the dispersion of a performance target by taking into account the range, standard deviation, average standard and variance. In the case of a bank, it should try harder to lower the variance in the process of delivering credit to the consumer, by rearranging, the cause of the delay in the delivery of credit, not in accordance with the specified promotion. Some of the improvements that can be made are: 1) standardization of the process, 2) all must be committed to standard operational procedures established, 3) Reduce some parts that will slow the process but remain in the corridor GCG (Good Corporate Governance).

References

[1] Constitutions Republic Indonesia No. 10 of 1998 about Banking.

[2] Edosomwan, J. A. (1993). *Customer and Market-Driven Quality Management*. Milwaukee, WI: ASQ Quality Press.

[3] Vincent, G. (2002). *Implementation Program Six Sigma, Integration With ISO 9000, MBNQ and HACCP*. Jakarta: Gramedia Pustaka Utama.

[4] Gummesson. (1987). Life service – A neglected area in service marketing. *Journal Service Marketing*, vol. 1, no. 1.

[5] Harry and Scroeder. (2000). *Six SIGMA: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations*. Currency.

[6] *Indonesian Banking Statistics*, vol. 16, no. 2, January 2018. Retrieved from Ojk.go.id

[7] Lewis, R. C. and Booms, B. H. (1983). The marketing aspects of service quality, in B. L. L. G. Shostack and G. Upah (eds.) *Emerging Perspectives in Service Marketing*, pp. 99–107. Chicago: American Marketing Association.

[8] Harry, M. J. and Schroeder, R. R. (2008). *Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations*. University of Virginia.

[9] Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, vol. 49, Fall, pp. 41–51.

[10] Thomas, P. (2002). *The Six-Sigma Handbook*. Jakarta: Salemba Empat.

[11] Sugiyono. (2008). *Qualitative and Quantitative Research*, pp. 3–17. Jakarta: Alfabeta.

[12] Tjiptono and Chandra. (2011). *Service, Quality & Satisfaction*. Jogjakarta: Andi Offset.

[13] Ayi, T. (2007*). Statistical Quality Control, With Minitan 16*. Bandung: Mardika Group.

[14] Tejaningrum, A. (January 2014). Inconsistency quality products (on six sigma programs) effect on customer loyalty: Case study of industry "Tahu". *Journal Management Study*, vol. 2, no. 1. David Publishing USA.