Journal of Theoretical and Applied Information Technology
10th April 2015. Vol.74 No.1

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

USING DATA MINING TO ANALYZE USAGE PATTERN OF MOBILE PROVIDERS (CASE STUDY PT. XL AREA SALATIGA)

[1]ANDREAS ARTAHSASTA TAROREH, [2]DANNY MANONGGA, [3]ADE IRIANI
[1, 2, 3] Information System Departement, SATYA WACANA CHRISTIAN UNIVERSITY
E-mail: [1]andreas_artahsasta@yahoo.com , [2] dmanongga@gmail.com , [3] ade.iriani@staff.uksw.edu

ABSTRACT

Data mining is one of the disciplines in computer science that explores the useful information about individual trends and segments. The numbers of mobile operators in Indonesia and high consumer displacement cause the competition among the operators to provide service and rate that attract users. PT. XL Axiata (XL) as the second biggest cellular providers in Indonesia gives special rate to the members of target community. The purpose of this study was to analyze the usage patterns of service build from XL community members who belong to groups of workers and students by conducting data mining using a pivot table on the users' profile and consumer service usage data for three consecutive months. The data was processed and analyzed to determine the marketing strategy in accordance with constumer needs in order to improve loyalty. The results of processing data showed that the variable of occupation and sex have effect on the usage patterns of service which emerged. Moreover, the internet service was a service that provides intake for most major mobile operators. By analyzing the usage patterns of community members, it can assist the service providers in determining the marketing strategy according to user needs.

Keywords: *Data Minning, Pivot Table, Usage Pattern*

1. INTRODUCTION

In 2012, the number of cellular telephone customers reached 281 million people, with a penetration of 122% from the total population of Indonesia [1.2]. The large number of cellular telephone customers reveals society's high need for non-cable communication, which has a positive effect for cellular operators. At this time, there are 10 GSM or CDMA operators, who offer various kinds of tariffs [3], so that it results in a tendency for customers to replace their providers based on their needs. This is seen from the high level of turnover of cellular telephone customers in Indonesia, which reaches 8.6% per month, much higher than other countries like India 4%, Malaysia 3.7%, the Philippines 3.1%, Thailand 2.9%, and China 2.7%. [4].

PT. XL Axiata (XL) is the second largest cellular provider in Indonesia with the number of customers reaching 68.5 million people [5]. XL tries to maintain and attract customers through various kinds of promotional strategies like through a social community. A social community can comprise students or workers who fulfill the following terms and conditions: 100% of the community members use XL, if the number of members is 100-200 people, and 80% if the number of members is more than 200 people. The community provides an opportunity for the XL marketing team to socialize about the program to the community members, in order that the XL users in the community increase. A determining factor of a community to become an XL social community is through the approach used by the XL promotion team. Whatever provider the community uses, whenever there are less than 100 members or 100% already use XL, then it will not be considered to become a social community because the goal to become a social community is to acquisition them from another provider, in order that they use XL. Determining a community to become an XL social community is an absolute right of XL. The company sees a community as having the potential to become a social community. Then it utilizes an approach establish a partnership.

XL community members receive various benefits, including 100 free XL community phone cards that are only distributed by the XL community and youth division. There are also special rates in various XL services as can be seen in Table 1, free Wi-Fi for universities that join the social community, and Sifoster (Integrated Information Systems) software that covers texting

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

broadcast and texting gateway software. Through Sifoster, students in schools or universities can receive information about student grades, student absenteeism, and testing system online. Another benefit is a special budget that is provided by XL to support activities carried out by the community.

An XL social community tries to increase its customer number and loyalty. Nowadays it is proved that XL social communities have already spread in central java, take for example in Semarang and Salatiga area, there are about 55 social community members such as BCA Semarang Branch, Ken Saras Hospital, Theresiana High School Salatiga, and SMA 7 Salatiga. Most of the social communities are working people and students. Therefore, in this research a sample is taken from Military Regional Commando IV Diponegoro (Kodam) from a worker group and STIKES Ngudi Waluyo from a student group.

To get customer satisfaction, there needs to be products and services that match with customer needs. This cannot be achieved without identifying customer usage behavior [6]. Based on this background, the goal of this research is to analyze consumer behavior patterns that come from worker and student groups.

2. LITERATURE REVIEW

2.1 Related Works

There are several kinds of research related with data mining and the pattern of using the service. One of these was research about the customer segmentation based on service usage pattern value in telecommunications. This research used a K-mean cluster analysis. Customers were identified and divided into 9 segments with different behaviors, so that it facilitated cellular operators to determine marketing strategies based on customer needs [7]. Another research was about the allocation of cellular network resources based on considering marketing in creating a resource allocation model. Customers were grouped based on customer profiles and service usage patterns. The 'first come first serve' aspect was also utilized, so that customers with low usage could still have the opportunity to use resources to get a service, depending on the provider's policy. By applying this allocation model, a company can maximize using its resources according to the level of customer needs [8].

Research about a strategic analysis in promoting a university, by using data mining on university student data, revealed that the promotional strategies utilized were unable to successfully reach the target. By conducting data mining towards the registration data of potential university students, a clustering technique was applied to find the segment of potential university students, so that the promotional strategy could be more structured and better reach its target. Information about potential university student data has an important role in determining the promotional strategy, where the promotional team from a university can promote a faculty based on student interests, so that it can increase the number of students and improve the efficiency of the promotion budget [9]. Then there was research about the patterns and trends of cellular telephone customers by using a data mining technique, analyzing the possibility of customers switching to another provider through factors that influence the churn or non-churn, so that a provider could make improvements and do innovations according to aspects that were considered as lacking by customers to anticipate the potential of customers switching providers [10].

Having a deep understanding of consumer behavior is very valuable information for cellular providers. The most important aspect to increase consumer loyalty is customer satisfaction [11].

Based on the earliest research related with consumer behavior patterns and using the clustering technique in data mining, all of previous research focus on analyzes costumer needs, and how to fulfill costumer satisfaction. In this research PT.XL already applying social community as one of their marketing strategy. This research will be conducted to analyze the consumer behavior patterns of XL cellular provider social community members by using simple tool Microsoft Excel 2010 pivot table add-in, and comparing the communities that are from the worker group and student group. Based on the service usage pattern in both communities, XL cellular providers can determine the right strategies to increase service usage to increase revenue.

2.2 Data Mining

Data mining or knowledge discovered in data is an academic discipline in the computer field. The computation process in data mining uses a specific algorithm and approach involving matching learning, statistics, and a data-based system to find the large hidden patterns in the data, so that it can predict future trends. [12].

Through a data mining statistical analysis, marketing can search for useful information about individuals, trends, and segments. Data mining uses statistics and a mathematical technique like cluster analysis. Consumer data can be used to get information to provide 'great deals' to consumers.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

The data gathered by a company can be put in a data warehouse, where the sales can capture, query, and analyze the data to get a depiction about individual consumer needs and responses, so that marketing activities can be customized directly to consumers.

2.2.1 Pivot Table

A pivot table is a feature from Microsoft Excel to arrange, group, and investigate data in paperwork. Data can be arranged to become attractive lines and columns, so that it displays easily understood information (Koschat, 2005). Power pivot is an add-in of Microsoft Excel that is compatible with Microsoft Excel 2010 and Microsoft Excel 2013. This facilitates users to conduct a data analysis and make a sophisticated data model.

In a pivot table, Microsoft Excel add-in, data can be imported and integrated automatically from several kinds of data formats like Microsoft Excel (.xlc), Microsoft Access, and even from the Internet. This greatly facilitates users for making sales reports. By using a pivot table, data can be easily imported, integrated, and then visualized in the form of a chart or pivot table report. In this research, data mining is conducted by using a pivot table because it is relatively easy and can fulfill data processing needs. Company can reduce cost for making a new business intelegence aplication which is more expensive than a simple tool like microsoft office. All of the social community's service users' data is in an Excel format, and data in another format can be easily integrated in an Excel format.

The community provides an opportunity for the XL marketing team to socialize about the program to the community members, in order that the XL users in the community increase. A determining factor of a community to become an XL social community is through the approach used by the XL promotion team. Whatever provider the community uses, whenever there are less than 100 members or 100% already use XL, then it will not be considered to become a social community because the goal to become a social community is to acquisition them from another provider, in order that they use XL.

2.2.2 Arrangement of Consumer Data

Consumer data can be properly utilized by a company to get certain information as a consideration in determining special offers to consumers. Data which is gathered by a company can be entered in a data warehouse where the sales section can analyze the data to obtain inferences about individual consumer needs and responses. Then marketing activities can be customized directly to consumers [13].

The primary key to a company's success is gathering consumer-based values. A company can increase value based on certain leading strategies, like by reducing the number of consumers who switch to another company and improving the long-term relationship with consumers. The closer the relationship consumers have with a company, the greater the chance consumers will keep using the product. The level of potential growth from every consumer is seen through a "share of wallet" cross selling and up selling. It makes consumers with low profit gains become more profitable by stimulating them to buy in a greater quantity. Focusing on consumers with a high profit can result in providing them with special treatment like birthday greetings, small gifts, and sports or arts event invitations that can be sent to consumers as a reinforcing positive signal.

3. METHODOLOGY

This research methodology includes a literature study, interviews, and data analysis by using a Microsoft Excel 2010 pivot table add-in. XL user data is taken from 2 social communities: the Ngudi Waluyo Health College (STIKES) and the Military Regional Commando IV Diponegoro (Kodam) in Semarang. The data mining process of this research consists of 4 stages, which are problem definition, data gathering and preparation, data processing, and knowledge deployment.

In the problem definition stage, the goal of the project focus is determined from a business perspective, so that the problem that will be solved can use data mining and an implementation plan. The next step is data gathering and preparation. This stage covers data gathering and exploration, as well as determining the data that will be expelled, added, refined, or transformed.

Data preparation can significantly sharpen information that is found through data mining. The next stage is data processing. In this stage, choosing the field data is done by putting it into a frequency tabulation to get information from related variables. Then a cross tabulation and t-test are done by using SPSS to see the relationships and differences between variables. The last stage is knowledge deployment. In this stage, information gathering is done from the data model or integration from the data mining model until its application, data

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

warehouse infrastructure, or query and tools in making the report.

XL Social Community Special Tariffs

All XL social community members receive a special tariff according to the effective conditions and stipulations as seen in Table 1.

Table 1:XL social community members benefit (XL youth community, youth segment community PT XL Axiata, Tbk)

Communication without limits to all XL social community members	Communication without limits to all XL social community members	Communication without limits to all XL social community members and XL users
Every Rp.10.000 credit reload	Every Rp.25.000 credit reload	Every Rp.50.000 credit reload
Free calls to comunity members (00.00 – 24.00)	Free calls to comunity members (00.00 – 24.00)	Free calls to all XL users (00.00 – 17.00) Free calls to comunity members (00.00 – 24.00)
Free SMS to comunity members (00.00 – 24.00)	Free SMS to comunity members (00.00 – 24.00)	Free SMS to comunity members (00.00 – 24.00)
Valid for 10 days	Valid for 30 days	Valid for 30 days
Another Service that use normal tarif	Another Service that use normal tarif	Another Service that use normal tarif

1st Stage: Problem Definition

The focus of the problem in this research is: What is the XL customer service usage pattern that comes from a social community? What is the influence of the special tariffs given to social community members on the service usage pattern? What is the effect of gender, occupation, and service usage pattern? Then based on the focus of the problem, the needed data attributes can be determined.

2nd Stage: Data Gathering and Preparation

The next stage is data understanding. This stage involves collecting, preparing, adding, and reducing data according to the focus of the problem that will be solved. After the problem definition stage, the focus of the problem that will be solved is determined. In this stage, the needed attributes for data processing are determined to see the relationships between user profiles with service usage patterns and social community member usage (texting, telephoning, and the Internet) for 3 continuous months like what can be seen in Table 2 and Table 3.

Table 2 : User's Profile

Field	***Type***	**Content**
Gender	*Character*	Male or female
Latest education	*Character*	Senior High School, Undergraduate, PostGraduate
Age	*Character*	18-28 Years Old,29-39 Years Old, 40-50 Years Old, > 50 Years Old
Monthly average revenue	*Int*	Rp.20.000 - Rp 100.000
Reload credit intencity	*Int*	1,2 or 3
The most frequently used service	*Character*	SMS,Calls or Internet
SMS	*Int*	0 to 9, 10 to 19, 20 to 29, or >30
SMS Time	*Character*	00.00-12.00,12.00-17.00, or 17.00-00.00
Calls through the same provider	*Int*	1 - 20
Calls time	*Character*	00.00-12.00,12.00-17.00, or 17.00-00.00
Calls to other providers	*Int*	1 - 20
Calls time to other providers	*Character*	00.00-12.00,12.00-17.00, or 17.00-00.00
Telkomsel	*Boolean*	Yes or No
Indosat	*Boolean*	Yes or No
Three	*Boolean*	Yes or No
Axis	*Boolean*	Yes or No
Esia	*Boolean*	Yes or No
Flexi	*Boolean*	Yes or No
Fren	*Boolean*	Yes or No
Internet	*Int*	1-20
Internet function	*Character*	Social media or browsing

Table 3: XL social community members revenue

Field	***Type***
SMS Sept	*Int*
Calls Sept	*Int*
Internet Sept	*Int*
SMS Oct	*Int*
Calls Oct	*Int*
Internet Oct	*Int*
SMS Nov	*Int*
Calls Nov	*Int*
Internet Nov	*Int*

Journal of Theoretical and Applied Information Technology
10th April 2015. Vol.74 No.1

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

3rd Stage: Data Processing

In this stage, data is processed in several models based on certain attributes according to the information that will be displayed. Then the data is evaluated. Whenever the algorithm applied in the model needs to transform data, the working process will return to the next stage. This research uses a Microsoft Excel 2010 pivot table add-in. The data field will be entered into the frequency tabulation according to the value that wants to be displayed. By using a pivot table, the table structure can be modified in real time by dragging different columns in the layout provided, so that an analysis and data exploration can be done in real time. Then a t-test and cross tabulation are done by using SPSS.

Cross tabulation of qualitative data is a basic tool for empirical research. Cross tabulation is used to test hypotheses about the relationships between several variables, the relationship of increasing the value of one variable with another variable, so that it can assist in analyzing the relationship of one variable with another variable (White and Korotayev, 2004). The cross tabulation results are seen in Table 4. A paired t-test is conducted to examine the differences between two observations, the revenue of community members for 3 consecutive months, so that increases or decreases in revenue can be viewed as in Table 5.

Table 4:Cross Tabulation Result Between Variable

X1	X2	Hubungan
Gender	Occupation	√
	Average credit reload	√
Occupation	The most frequently used service	√
	Calls time	√
	SMS Time	×
	Number of SMS	√
	Calls to other providers by time division	×
	Reload Credit intencity	√
	Internet Function	√

The cross tabulation results of the consumer database variables show that there is a relationship between gender and occupation, the average phone credit renewal. The occupation variable also has a relationship with the service most frequently used, calling time, number of phone texts, intensity of phone credit renewal, and function of the Internet. Meanwhile, for the variables texting time and calling time through another provider, there is no relationship with the occupation variable.

4th Stage: Knowledge Deployment

In this research, Microsoft Excel 2010 is used as a data processing application, because it is considered as fulfilling the company needs into data processing. All of the data needed from the company database can be converted in an Excel format. Using Microsoft Excel can fulfill the data processing needs. Then by using a pivot chart, the data analytical results can be displayed.

4. ANALYSIS AND DISCUSSION

In this stage, an information search is conducted from the data model. The table can appear in the form of a pivot chart to present information. Interactive reporting tools can facilitate showing data, so that it is easier to be analyzed**.** Figure 1 depicts the revenue from Kodam and Stikes member customer service usage.

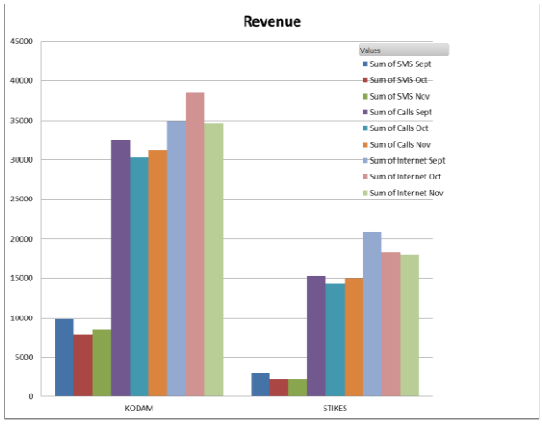

Figure 1: Revenue

Figure 1 details the average total revenue of community members for September, October, and November. The biggest revenue for XL, whether for students or workers, is when they spend their phone credits to pay for Internet service, and the least revenue is from texting service. This reveals that the Internet is not only used by teenagers/students, but it is also used by workers/adults. The Kodam members who are between 29-50 years old are relatively consumptive in using the Internet service.

Based on the cross tabulation results, there is a relationship between the gender, occupation, and average phone credit renewal. Females tend to be more consumptive than males, with an average phone credit renewal nominal for females of Rp100,000 and males of Rp50,000. Workers most frequently renew their phone credit with nominals of Rp50,000 and Rp100,000. Meanwhile, students renew their phone credit with nominals of

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Rp50,000 and Rp25,000. Therefore, it is best for students to be given special tariff promotions for renewals in nominals of Rp25,000, based on the level of phone credit usage and nominal, in order that students will continue to regularly use an XL cellular provider.

Males more often need a special stimulus to use a product, while females prefer to use a product without any particular motivation [6]. Males often read the product information first, while females have a relationship with a product more on a personal level, so that special attention needs to be given to males related to product information to increase their service usage. Then a personal approach is needed for females, in order that it creates a personal interest in a product being offered.

Based on the questionnaire data, more Kodam members use the telephone service, but according to service usage data, the biggest cost that they have is for the Internet service. In general, Kodam member revenue is bigger compared with Stikes member revenue. So, it can be concluded that the worker group is more consumptive than the student group.

Based on the available data, for the Semarang area there are 55 XL social communities, with 41 schools and universities as well as 14 social communities. The highest revenue comes from the student group with 2,000 university students. It can be surmised that in determining a social community, attention must given to whether it is a worker or student community group, the number of community members, and the average monthly phone credit usage. Based on the XL revenue data in the 2 communities for 3 consecutive months, there are increases and decreases in revenue as depicted in Table 5.

Table 5: Revenue Percentage Of Both Community

	Column Labels		
Values	KODAM	STIKES	Grand Total
Sum of % change SMS Oct	20,30%	24,33%	21,24%
Sum of % Change of SMS Nov	8,22%	-0,99%	6,16%
Sum of % Change of Telepon Oct	-6,96%	-5,85%	-6,61%
Sum of % Change of Telepon Nov	2,80%	4,19%	3,25%
Sum of % Change of Int Oct	10,41%	-12,57%	1,82%
Sum of % Change of Int Nov	-10,21%	-1,54%	-7,44%

Table 5 displays the revenue percentage of both communities compared with the revenue in September. In October, the texting service usage reduced by 21.24%, and in November it increased by 6.16%. The telephone service usage reduced in October by 6.61% and increased in November by 3.25%. Then for Internet service, it increased in October by 1.82% and decreased in November by 7.44%. Based on the graphics in Figure 1, XL can determine certain promotions or programs to increase revenue in months that show a decline. A t-test is used for texting, calling, and Internet service usage for 3 consecutive months from September – October and October – November, as depicted in Table 6, Table 7, and Table 8.

The following hypotheses can be devised as follows:

H_0 = There is an insignificant increase in texting usage for pair 1 and pair 2.

H_1 = There is a significant increase in texting usage for pair 1 and pair 2.

Table 6 shows the average differences between pair 1 texting usage and pair 2 texting usage. According to paired sample test SMS result the sig (2-tailed) for pair 1 show .000 so Ho is accepted. Therefore, there was no increase in texting usage from September to October. In the first month, after giving both communities a special tariff, there was a reduction in texting. However, pair 2 the sig result is .328 so Ho is rejected. Therefore, there was a significant increase in texting usage from October to November.

Table 7 reveals the average differences between calling usage of pair 1 and calling usage of pair 2. According to paired sample test calls result the sig (2-tailed) for pair 1 show .007, so Ho is accepted. Therefore, there was no increase in calling usage from September to October. In the first month, special tariffs were given to both communities, resulting in a reduction of telephone service usage. However, pair 2 the sig result is .202, so Ho is rejected. Therefore, there was a significant increase in calling usage from October to November.

Table 8 depicts the average differences between pair 1 Internet usage and pair 2 Internet usage. According to paired sample test Internet result the sig (2-tailed) for pair 1 show .511, so Ho is rejected. Therefore, there was a significant increase in Internet usage from September to October. However, pair 2 the sig result is .008, so Ho is accepted. Therefore, there was no increase in Internet usage from October to November.

In the first month, after enacting the special tariffs, there was a reduction in calling and texting service usage revenue in both communities. Meanwhile, for Internet service there was an increase in revenue. The community members still used the Internet service, even though the enacted special tariffs did not cover Internet service. Therefore, customers used the Internet with normal

Journal of Theoretical and Applied Information Technology
10th April 2015. Vol.74 No.1

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

tariffs. In the next month, there was an increase in calling and texting service usage, but a reduction in Internet usage. Customers took more advantages from using the services that had special tariffs, compared with the Internet services that did not have special tariffs.

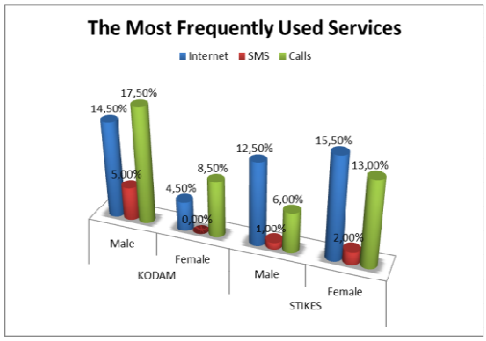

Figure 2: The Most Frequently Used Service

Figure 2 depicts Kodam members who are mostly in the 29-39 year old age range, included in the adult category that more often use the telephone service. Meanwhile, for the STIKES members who are mostly in the 18-23 year old age range and included in the teenage category, they more often use the Internet service. From both communities, the Internet service is most often used at 47%.

Although the Internet service is not included in the special tariffs for social members, they still use the Internet with the valid normal tariffs. Telephone service is the second service most frequently used in both communities. With relatively cheap or free tariffs for the same operator, it encourages community members in the worker and student groups to tend to use the telephone service compared with the texting service, which is the least used service in both communities. As a result, promotions can be conducted to increase texting service usage.

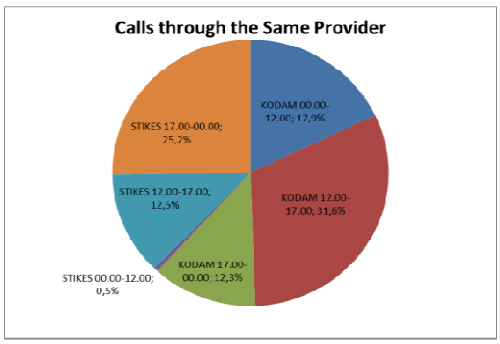

Figure 3: Calls Through The Same Provider

Figure 3 depicts calling through the same provider from both communities. The highest calling percentage is 31,6% done by Kodam community members from 12:00 PM – 5:00 PM. Meanwhile, for STIKES the highest calling percentage through the same provider is 25,2% from 5:00 PM – 12:00 AM from the total of all calls through the same provider.

This is due to the KODAM community members being included in the worker group, so that it facilitates the members to call through the same provider during working hours for office needs, while STIKES community members who are included in the student group use the telephone service through the same provider after office hours, because at that time most of their classes are over and they can make phone calls. In addition, based on the available data of the phone credit renewals every month, Kodam members tend to renew their phone credits at a nominal of more than Rp50,000 with a special tariff that is valid for community members who renew their phone credits of Rp50,000. They are entitled to make calls to all XL numbers from 12:00 AM – 5:00 PM, so that there is a relatively large number of calls made by Kodam members during these hours.

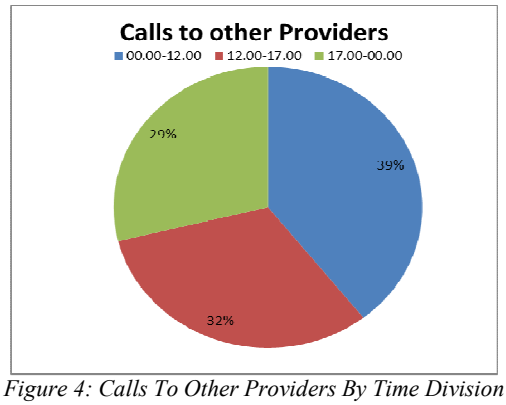

Figure 4: Calls To Other Providers By Time Division

Figure 4 reveals the times calls are made to another provider are relatively balanced. There is no relationship between the occupation variable and the call to another provider variable, whether from workers or students. Making calls to another provider is highest from 12:00 AM – 12:00 PM, in contrast with calling through the same provider that has the lowest number of calls during this time. This is due to the normal tariffs being in effect for making calls through another provider, so that the times to make calls between community members tends to be even. Making calls through another provider is not influenced by the occupation variable, so that the same service usage promotions can be used for both communities.

Journal of Theoretical and Applied Information Technology
10th April 2015. Vol.74 No.1

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

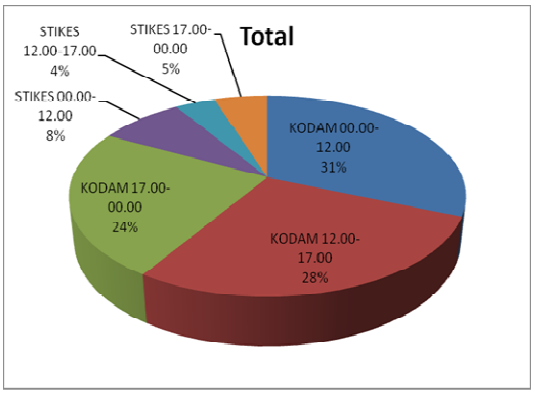

Figure 5 : Calls To Another Provider Based On The Community

Figure 5 depicts calls to another provider from both communities were highest among Kodam members with 31% made from 12:00 AM – 12:00 PM. From the total number of calls, there were 83% made by KODAM members and only 17% of calls were made by STIKES members who came from the student group. For calls to another provider with normal tariff rates, there were no special tariffs in effect for the community members, so that the Kodam members who had an income tended to make calls without thinking about the cost they spent. Call tariffs to another provider are the same the whole day long; there are no tariff differences according to the time. Therefore, it can be seen in the figure of calls made by Kodam members that the frequency of calls made are about the same between the 3 time periods at 31%, 28%, and 24%. Other providers that are often contacted by the community members can be viewed in Figure 6.

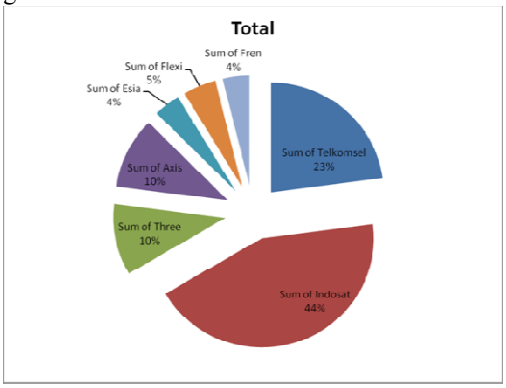

Figure 6: Other Providers Most Frequently Contacted

Figure 6 reveals that calls to another provider are dominated by those made through the GSM network, while only a small number of calls are made through the CDMA network. This is influenced by the relatively small number of CDMA users in Indonesia and the tendency of its community members to contact the provider in the CDMA network through their CDMA numbers. XL can use the data to analyze more in-depth, like the background of the community members or the provider that is most frequently used around the community like in Salatiga and Ungaran to determine a promotional strategy

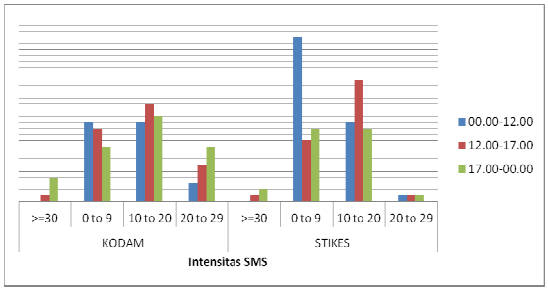

Figure 7: Time And Number Of Texts

Figure 7 shows that both communities engage in texting mostly between 0-9 texts per day. This conveys that there is a relatively low level of texting in the worker group and the student group. This is due to an increase in using social media through the Internet; individuals tend to engage in chatting more frequently than texting.

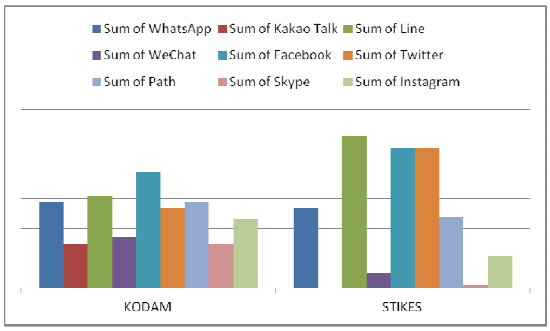

Figure 8: Social Media Usage By Kodam And Stikes

Based on 200 respondents in the Kodam and Stikes communities, Facebook is the most frequently used social media application in both communities. In Figure 8, it can be seen that the number of Stikes members who use a social media application is greater than that of Kodam members. However, an interesting aspect is that based on the number of social media applications used, Kodam members use more social media accounts than Stikes members.

In the Kodam community, there are 225 accounts for social media users from a total of 9 different kinds of social media. In contrast, Stikes members only have 213 accounts. Based on the

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

data in Figure 3, Kodam members most often use the telephone service compared with the Internet service. However, based on the social media usage data, Kodam members have more accounts than Stikes members, who more frequently use the Internet. It can be surmised that Stikes members use the Internet with more regularity, but a large number of Kodam members own more social media accounts.

5. CONCLUSION

Using data mining to service usage data from social community members makes company can analyze the usage pattern to make a better promotion strategy. From the usage pattern it can seen that a social community is an effective promotional strategy. By having a special tariff and support towards community activities, it is able to attract community members' interest to keep using XL provider. By using a simple tool like pivot table Microsoft Excel add in, a company does not need to make a new business intelligence application. Using the available application will be able to reduce the company expenses, moreover, it is easy to use, and can meet the needs of the company especially for big data analysis and processing.

The number of community members who use XL or service usage revenue tends to increase and be stable. The special tariffs provided have an influence on the pattern of using the community member services. The largest revenue from both communities comes from using the Internet, then making phone calls, and the least is from texting. Overall, service usage among student or worker groups uses a special tariff scheme. One of these is in making calls through the same provider.

The worker group with a phone credit renewal nominal of Rp50,000 makes a larger intensity of phone calls through the same provider compared with the student group, especially from 12:00 PM – 5:00 PM. The student group with a phone credit renewal Rp25,000 makes fewer phone calls through the same provider compared with the worker group, because the special tariff that is in effect with a nominal of Rp25,000 is only for making calls among fellow community members. However, the worker group members who make phone calls with a nominal of Rp50,000 can call all XL numbers from 12:00 AM – 5:00 PM.

One of the factors that influence the increase and decrease of revenue is the activities done by the communities. Based on the interview results, an increase in revenue is influenced by the activities done in the communities and the occupation factor for the Kodam members. There is a much greater revenue from Kodam members compared with Stikes members. It can be concluded that worker group community members are more consumptive than Stikes community members who are from the student group. Based on the services used, the biggest revenue is from the Internet service of community members, so that cellular providers must pay more attention to the Internet package products and services that they offer.

According to the patterns that emerge from the service usage data of XL social community members, it is seen that community members tend to join the special tariff schemes provided in using a service. As a consequence, a company must be more observant in determining the form of special service promotion to maximize the service with low usage like in texting. Meanwhile, for the Internet service, it is best to keep using a normal tariff, because the Internet service provides the greatest revenue for XL. PT.XL also needs to offer various Internet packages for users, keeping in mind the competition with other providers and the high level of Internet usage.

There is a tendency for customers to choose a cellular operator based on its Internet service. Whenever the Internet service package tariff is too expensive, the Internet quota that is provided is not enough to fulfill customers' needs, or the access is slow, it will increase the likelihood that customers switch providers, even if making phone calls and texting is cheap. This is apparent based on the service usage schemes used in both communities. The worker and student groups both have high Internet usage compared with the other services.

A pivot table is a very interactive reporting tool to do data mining. A large amount of data processing can be easily done in an effective and efficient way. Applying a data mining algorithm can be done automatically by using the Microsoft Excel application with pivot table add-in, so that it facilitates users to do data mining with an appropriate algorithm for processing data to become needed information.

This research only took a sample of 200 community members with revenue from September until November. Future research can apply data for one year with more attributes, so that a more complete picture can be seen of consumer behavior patterns.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

REFERENCES:

[1]. Central Intelligence Agency (CIA). The World Factbook. 2014. https://www.cia.gov/library/publications/the-world-factbook/geos/id.html (Accessed on 2014-08-19).

[2]. The World Bank Group. Mobile Cellular Subscriptions (per 100 people). 2014. http://data.worldbank.org/indicator/IT.CEL.SETS.P2 (Accessed on 2014-08-20).

[3]. Panji, A . Terlalu Banyak Operator Seluler Diminta Bersatu. *Kompas.com*. 13-06-25. http://tekno.kompas.com/read/2013/06/25/16145334 (Accessed on 2014-03-20).

[4]. Yuliastuti, D. Perputaran Pelanggan Seluler di Indonesia Tertinggi di Dunia. *Tempo*. 14-08-21. http://www.tempo.co/read/news/2007/08/02/056104843/Perputaran-Pelanggan-Seluler-Indonesia-Tertinggi-di-Dunia (Accessed on 2014-03-16).

[5]. Ibrahim, D & TVT, C. Axiata Group Berhad. 2014. 1Q 2014 Results. http://axiata.listedcompany.com. (Accessed on 2014-08-21).

[6]. Chadha, S.K. & Kapoor, Deepa. Effect of Switching Cost, Service Quality, and Customer Satisfaction on Consumer Loyalty of Cellular Service Providers in the Indian Market. *The Icfai University Journal of Marketing Management,* Vol. VIII, No.1 (2009):23-37.

[7]. BĂCILĂ, Mihai, et al. Customer Segmentation Based on the Value of Consumption Patterns in Telecommunications. *International Conference "Marketing – from Information to Decision" 6th Edition* (2013) 36-50.

[8]. Kastro, Yomi, et al. Resource Allocation in Cellular Networks Based on Marketing Preferences. Wireless Netw (2010) 16:27–38. DOI 10.1007/s11276-008-0112-7.

[9]. Suhariyadi, Juni 2012, "Analisis Strategi Promosi Universitas dengan Data Mining (Studi Kasus: Biro Promosi dan Hubungan Luar UKSW Salatiga)", Salatiga: Universitas Kristen Satya Wacana.

[10]. Hillaludin, 2011, "Analisis Perpindahan Seluler dengan Metode Data Mining (Studi Kasus Pelanggan Telkomsel), Jakarta: Universitas Indonesia.

[11]. Mantansari, Alens D., et al. Perilaku Brand Switching (Perubahan Merek) pada Telepon Seluler yang Dipengaruhi oleh Reference Group (Kelompok Acuan) (Studi pada Mahasiswa Psikologi Universitas Brawijaya Malang), Jurnal Universitas Brawijaya. http://psikologi.ub.ac.id/jurnal-mahasiswa/(Accessed on 2014-03-19).

[12]. Astudillo, César, et al., Data Mining in Electronic Commerce – Support vs. Confidence. *Journal of Theoretical and Applied Electronic Commerce Research*, Vol. 9, Issue 1, January 2014.

[13]. Kotler, Phillip and Keller, Kevin L. *Marketing Management*. 14th ed. USA: Prentice Hall, 2012.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Tabel 6 :Paired Sample Test SMS

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	SMS revenue September – October	2152.160	6475.677	457.899	1249.202	3055.118	4.700	199	.000
Pair 2	SMS revenue October - November	-313.145	4512.630	319.091	-942.379	316.089	-.981	199	.328

Tabel 7 :Paired Sample Test Calls

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Calls Revenue in September - October	1653.520	8552.065	604.722	461.034	2846.006	2.734	199	.007
Pair 2	Calls Revenue in October - November	-724.120	8005.856	566.100	-1840.444	392.204	-1.279	199	.202

Tabel 8 : Paired Sample Test Internet

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Internet Revenue in September – Oktober	-508.880	10920.452	772.193	-2031.610	1013.850	-.659	199	.511
Pair 2	Internet Revenue in October - November	2114.305	11129.808	786.996	562.383	3666.227	2.687	199	.008