In the name of God

Increasing Mobile Operator Revenue Out of VAS, A System Dynamics Approach

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Abstract

Telecommunication industry is not comparable with many industries in view of rapid market and technological change. In this industry, Mobile Communications is one of the most attractive segments. The new and novel trends can be seen in Telecommunication industry from time to time which suggesting various dynamics and relationships in this industry development.
In this article, we will examine and analyze existing trends in mobile operators' services to find out the position of Value Added Service (VAS). Then, existing dynamics in delivering Mobile VAS will be deduced through VAS value chain analysis and its market characteristics. We will simulate and execute the proposed dynamic model and get acquainted with the behavior of model elements and analyze them. Finally, two policies will be suggested and with the analysis of results of these two policies, some recommendations will be made for mobile network operators to maximize their revenues out of VAS.

Keywords: Mobile VAS, Mobile Commerce, Value Chain, System Dynamics

1- **Introduction**

Telecom industry historically, due to its intrinsic monopoly and its tremendous impact on human lives, has been a profitable industry. With the beginning of deregulation in 80's and advent of mobile phones and internet, the telecom industry experienced increased competition. As in the beginning of the deregulations due to increased productivity, the revenues of telecom companies went high, however, with increased competition, the profit margin of these companies reduced. This fact with technology development persuaded the mobile phone operators to deliver new kind of services in addition to voice services. Mobile phone operators for attracting more subscribers and increasing revenue per user, started to deliver Value Added Services (VAS) including short messaging system (SMS), data transmission and internet connection services (GPRS),controlled internet portal, new voice services like voice inbox, multimedia messaging services(MMS),videoconferencing , location based service(LBS) and TV broadcast on mobile phones.
With delivering of VAS from operators, many applications can be developed using these basic services like SMS, MMS, geographic positioning and connecting to internet. In this study, some basic services like SMS and mobile internet which are delivered from mobile network operators are called Value Added Services or VAS. Mobile Services or M-Services also suggesting some applications, generally delivered by third parties companies which are different form network operators, including M-Banking and M-Commerce.

2- Problem definition

The main problem on which we will focus in this article is related to this fact that in mobile operators' services market, especially when the market is going toward the saturation and maturity, the value added service (VAS) of each operator will be the most important factor of operators' competition. As the voice market reaches saturation continued industry growth is contingent on the development of new mobile data services or VAS (1).

From the introduction of mobile phone services to the market until the saturation of this market, the main service that mobile phone operators offer was the voice service. However, saturation of voice service industry and increased competition in the market gave rise to offering new services and utilizing new strategies by different operators to enable them to get more market share and profitability out of this industry.

Considering Porter Generic strategies (2), we can find out that the main direction of operators' movement in the market will be nothing except differentiation and offering new features in their services. In this position, cost leadership strategies should be used vigilantly or in combination with focus strategy since it may develop price war and lower profit for each operator.

The most significant factor and differentiation method in the saturated and mature service market is offering Value Added Services or VAS in addition to voice service which will give rise to more market share and market development.

Our **main problem** in the study is "How an operator can exploit VAS, considering dynamics of the Mobile core and augmented services and M-Commerce, to increase its revenue and success in competition".

To get more knowledge into the significance of the VAS in the mobile operators' services market, we will exhibit in the following diagrams (fig. 1) the statistics about the mobile phone penetration, services and revenues in Iran and world.

This diagram (fig. 1) is demonstrating the statistics about the subscriber growth rate in Iran.

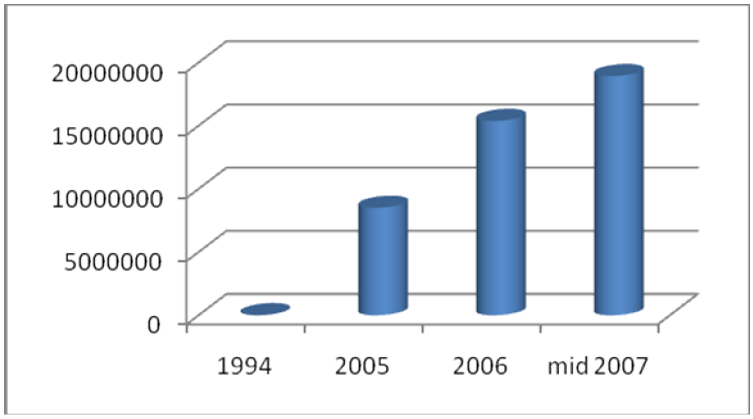


Figure 1: Iran mobile operators' subscribers
Source: Iran Telecommunication Company Report, August 2004

As indicated in figure 1, the growth rate of subscribers is exponential which is according to the offer of voice services by operators; however this exponential trend will not be stable which the growth trend of other countries is approving this claim.

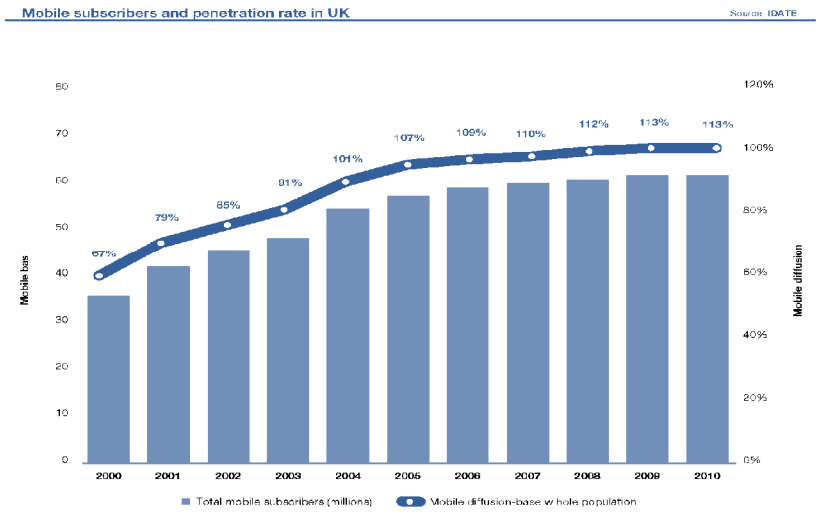


Figure 2: UK mobile penetration rate
Source: IDATE

According to figure2, in UK, Exponential growth slowed when the market is approaching to maturity. In fact, growth rate is logistic, S-shaped form. The trend is observed not only in UK but also in many other developed countries. The following diagram (fig.3) displays the above point.

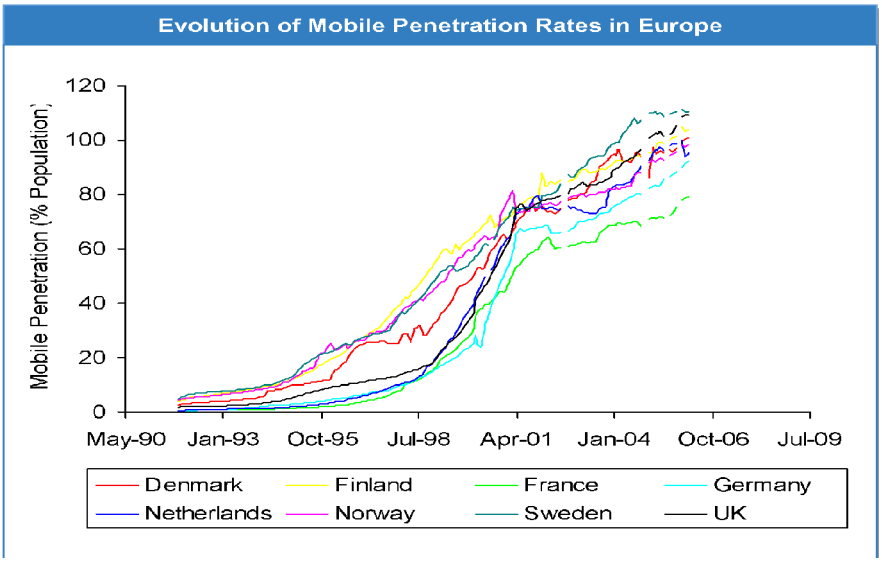


Figure 3: mobile penetration rate in eight countries

Similar trend is predicted for Iran, i.e. in future, penetration rate growth in Iran will have remarkable decline. The next chart (fig. 4) is Iran mobile penetration rate forecast:

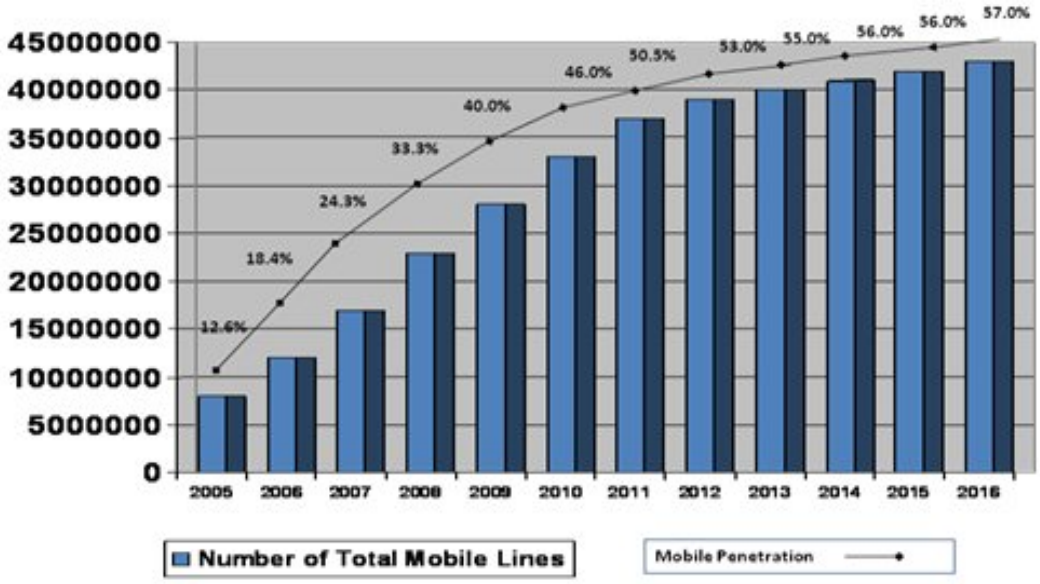


Figure 4: Iran penetration rate growth prediction
Source: Iran Telecommunication Company Report

Another concern is decreasing trend of Revenue per User (RPU) in Iran (3) and other part of world as indicated in figure 5.

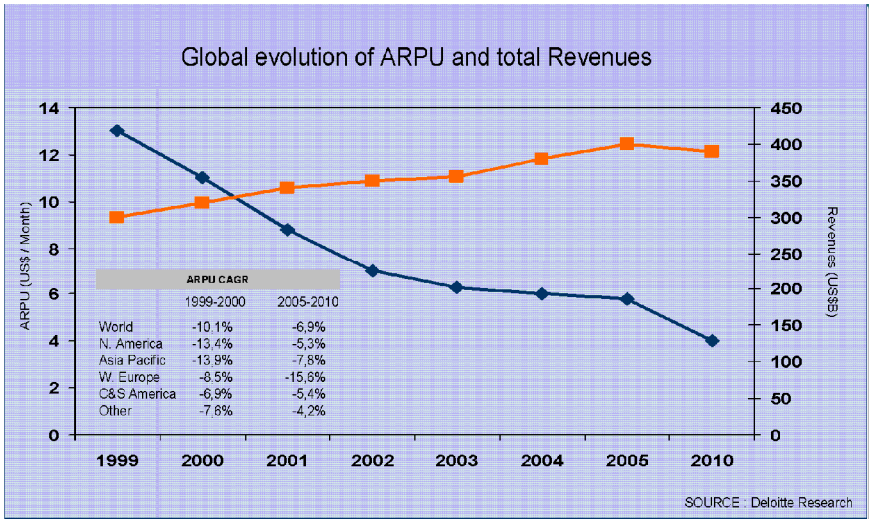


Figure 5: Global trend of mobile operators Revenue & RPU.
Source: Deloitte Research

The above diagram (Fig.5) is exhibiting both total revenue and revenue per user of mobile operators' services in the world. Considerable decline of RPU is seen in the diagram, nevertheless total revenue keep increasing. Obviously the main reason of increasing total revenue, despite of RPU decrease, is mobile network subscribers' increase, however as indicated before, mobile network subscribers will decline in Iran and similarly in other countries. Therefore, with existing operators' strategies, applications and services, operators' revenue will decline certainly. This prediction is confirmed by "Deloitte Research" in figure6.

Operators' solution for this issue is VAS which is widely accepted and used. Following figure (fig. 6) confirm the assertion.

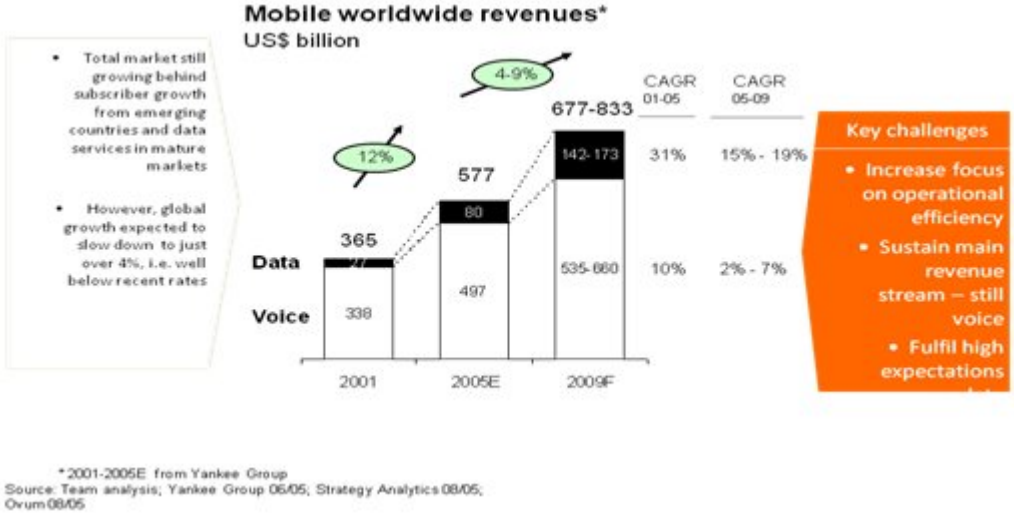


Figure 6: Mobile worldwide revenue, dividing voice and data share
Source: Yankee group

As observed in figure6, revenue growth of voice service between 2001 and 2005 was %10, whereas revenue growth of VAS service was %31. This difference is predicted to increase in the future. All above trends and forecasts indicates significant role of VAS in mobile operators' service market which should be carefully observed and considered.

3- VAS Industry Review

3-1- VAS Value Chain

VAS value chain includes both concepts of M-service and VAS (4). Significant players in the VAS market can be recognized with Study of VAS value chain which are categorized as follows (5):

- Network operators: These operators provide the infrastructure for M-Services with delivering of VAS. Hence, delivering any M-Services from any independent companies is depending on delivering VAS from operators.

- Service providers: deliver M-Services on VAS and sell them. Operators usually propose some special platforms on which M-Services providers deliver their services and is charged to a percentage between 10 to 25 percent for using of platform.

- Content Providers: These companies provide required contents like text, voice, music, picture and film for service-oriented contents and sell them to M-Service provider companies. In immature market and in most cases, M-Service providers deliver the required contents themselves.

- Mobile Phone and Equipment manufacturer: These companies have crucial roles for VAS prevalence with their equipments which support these services. In many cases, new VAS is introduced to the market with cooperation of both operators and equipment manufacturers.

- Infrastructure Providers: These companies provide backbone of mobile phone network for operators regarding hardware and equipments and should deliver required service quality for VAS.

- VAS End Users: These users, eventually determine whether VAS is successful or not.

- Government: With approved rules and regulations and its monitoring activities is affecting VAS a lot.

Operators are cores in the value chain (5). On the one hand, operators possess network infrastructure and large customer resources. On the other hand, Service Providers can only provide services to end users through the network infrastructures owned by the operators. These two facts make the mobile network operators have absolute advantages in the value

chain. However, this means also that the operators must be responsible for maintaining a good and healthy value chain.

3-2-VAS System lock-in and Growth Engine

System lock-in (6) can be observed clearly in operators' services. In a simple case, when an operator is delivering only the voice service or talking possibility, each individual will not change his/her phone number after receiving the number from operators. This fact is shown in the following cause-and-effect diagram (fig.7).

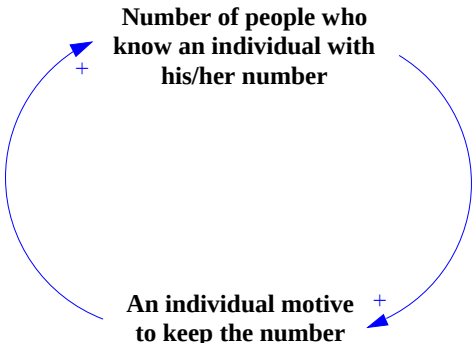


Figure 7: Voice Service lock in cause-and-effect diagram

Not only in voice but in VAS and M-Services, System Lock-in and path dependence can be recognized. A local service provider can be considered as an example, when delivering its Location-Based Services (LBS) to mobile network subscribers according to their geographical position. Each subscriber can find required local businesses e.g. nearest restaurant or auto repair shop in an area easily through services provided by local service providers.

Local businesses are placed at one end of these services and subscribers or customers of these businesses are at the other end. In the following diagram (fig.8), the existing dynamics in delivering of M-services is exhibited.

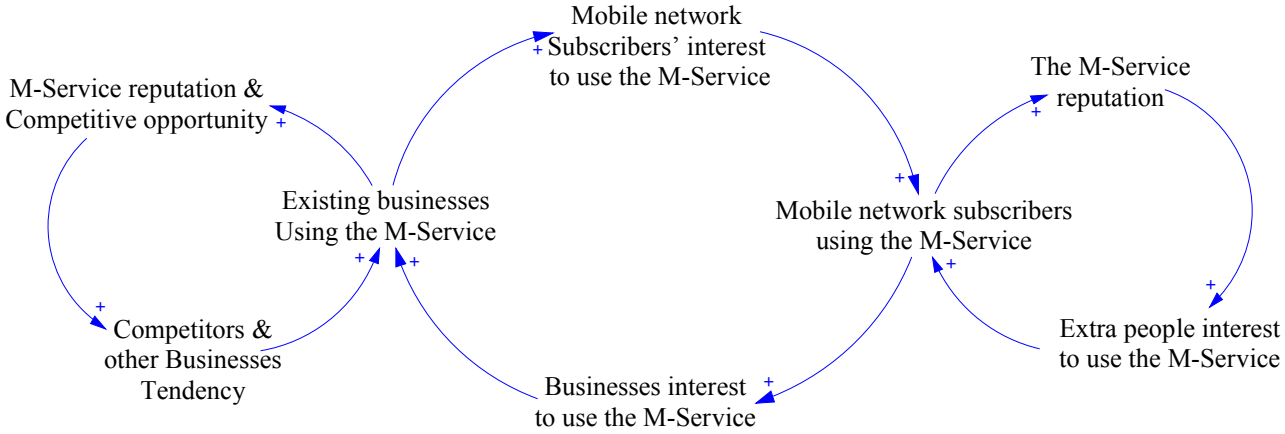


Figure 8: M-Service Cause-and-effect Loop Diagram

Such dynamics will be observed in most of M-Services contents which give rise to rapid adoption of M-Services among Mobile network subscribers and various businesses.

VAS growth engine (7) is related to both voice and M-Service growth engine, however, the number of mobile network subscribers, the volume of M-Services delivering to subscribers through VAS, general economic condition in the society and government regulations are also another effective factors on VAS growth. VAS growth dynamic will be exhibited in our proposed model.

4- Model Assumptions & Dynamic Hypotheses:

1-VAS supply usually is more than VAS demand. In other word, VAS operators permanently have satisfied any VAS demand with required investment, equipments and technology.

2- In proposed model, the number of subscribers are assumed constant, i.e., the mobile operators market reached to a saturation and maturity. This assumption is to some extent, contradictory with real world conditions; however, it not only helps us to simplify the problem but also, will let us to concentrate on our main dynamics.

3- Our main target in the model is to maximization of the operator revenue. Two factors affect the revenue. One is the VAS subscribers and the other is VAS average usage rate of subscribers, hence we can increase the revenue of the operator with these two factors.

4- In our proposed model, the price of operator services is assumed constant and is not considered a factor of revenue increase since the operators service market is under perfect competition conditions. Based on Economics science, in perfect competition conditions the price is constant. This assumption has been entered in our model due to unknown VAS service price elasticity and will help to model authenticity.

5- M-Adoption is considered the adoption of mobile phone and services in the society. There is no upper limit for this adoption and can be increased without any limit. Following three factors affect M-adoption based on facts addressed in references (8) and (9):

- External Factors: This factor is out of the control of operators and is considered as environmental factor. Society welfare condition, income per capita, cultural readiness, literacy level and government policies and regulations can be categorized in this field. All of external factors are considered constant.

- VAS Communicating: This is related to the volume of advertising and communicating by operators and has direct impact on M-adoption.

- VAS M-Services: These services are delivered by independent companies to operators subscribers. The VAS adoption in society will increase if these services expand.

6- M-services growth is affected by VAS subscribers (10).In other words, the companies which is delivering M-services will expand their businesses only when VAS subscribers will be ample.

7- VAS Prevalence Rate: The VAS Prevalence rate is a function of advertisement of VAS operators and rate of M-Adoption.

8- Three factors impact the VAS subscribers' growth rate:

- Number of mobile operator subscribers: this factor is considered as a limit for VAS subscribers.
- VAS prevalence rate: It is clear that for higher prevalence rate, the adoption of operator VAS is more.
- VAS current subscriber: For more VAS subscriber in a society, more people get acquainted with this service and consequently, this has positive impact on number of subscribers (8).

9-The revenue of operators' VAS is calculated by multiplying of VAS subscribers' average usage in VAS subscribers' number. The average usage rate in our model is currency unit.

10-The average usage rate of each subscriber has direct relationship with M-Services and M-Adoption in a given society.

11- With increase in mobile operator subscribers gradually in time, due to operators' competition and economy of scale, each subscriber average usage, i.e. revenue per user (RPU) will decrease.

12- In our supposed model, due to market saturation, the market development is not taken into account, however, under some circumstances; there is the possibility of transfer of subscribers from an operator to other operator due to its VAS, i.e. increased subscribers of an operator is coming from other operators.

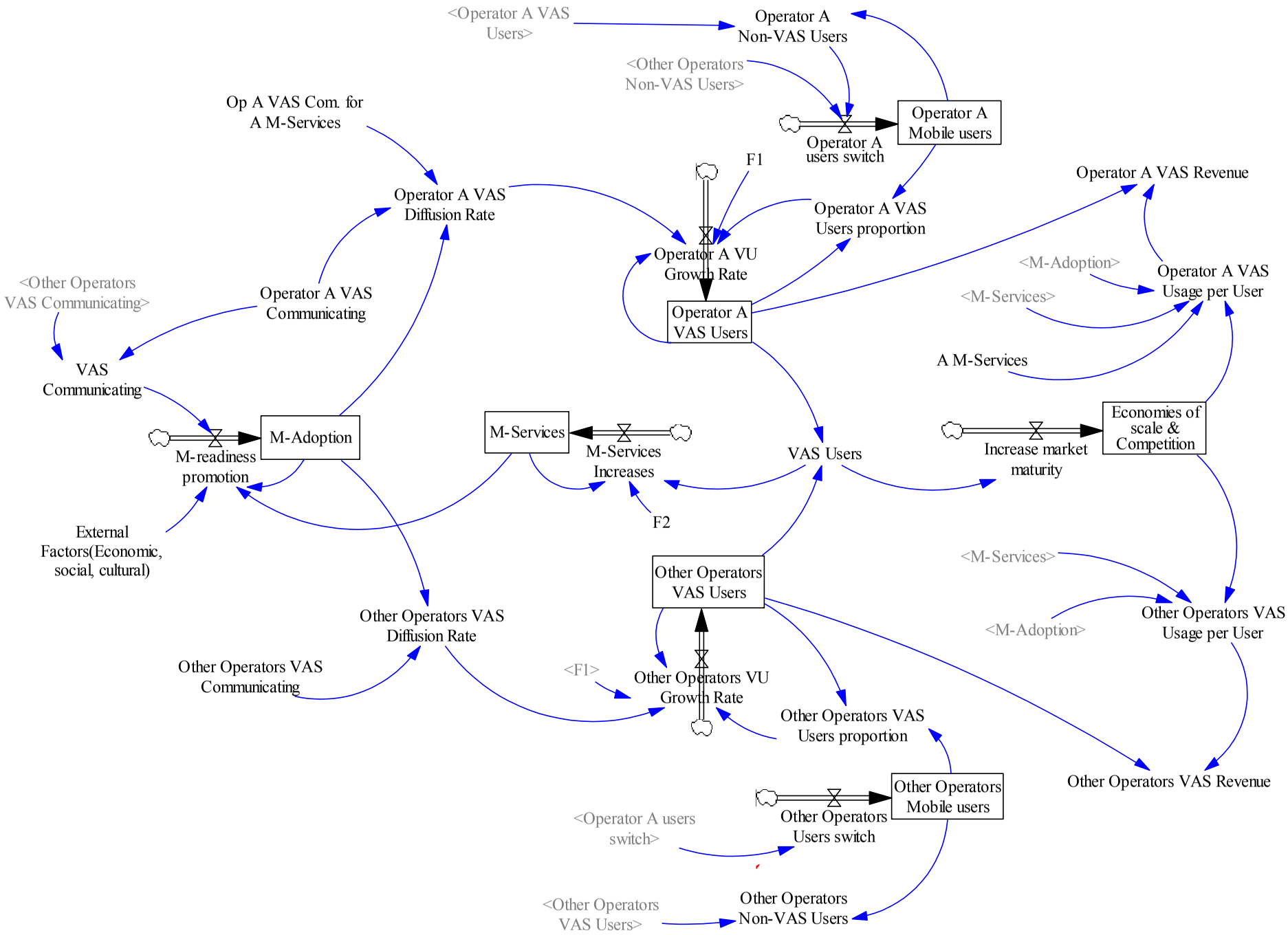
5- Dynamic Model

The model which is exhibited below has two parts:

1-The first part is "operator A" whose revenue should be maximized

2-The second part is the "other operators" against which our benefits should be considered.

For each operator, similar variables are applied separately. In addition to operators' specific variables, three "stock variables" is observed in the model which is treating like contextual and environmental variables and it is supposed that have equal effect on all operators variables. These variables can be seen in the middle of model as model symmetrical line.


<Operator A VAS Users>
Operator A Non-VAS Users
<Other Operators Non-VAS Users>
Operator A Mobile users
Operator A users switch
Op A VAS Com. for A M-Services
Operator A VAS Diffusion Rate
F1
Operator A VU Growth Rate
Operator A VAS Users proportion
Operator A VAS Revenue
<M-Adoption>
Operator A VAS Usage per User
<M-Services>
<Other Operators VAS Communicating>
Operator A VAS Communicating
Operator A VAS Users
A M-Services
VAS Communicating
M-Adoption
M-readiness promotion
M-Services
M-Services Increases
VAS Users
Increase market maturity
Economies of scale & Competition
F2
External Factors(Economic, social, cultural)
Other Operators VAS Users
<M-Services>
Other Operators VAS Usage per User
<M-Adoption>
Other Operators VAS Diffusion Rate
Other Operators VAS Communicating
<F1>
Other Operators VU Growth Rate
Other Operators VAS Users proportion
Other Operators VAS Revenue
Other Operators Mobile users
<Operator A users switch>
Other Operators Users switch
<Other Operators VAS Users>
Other Operators Non-VAS Users

6- Simulation and Analysis

Our targeted variable in the model is the operator A "revenue". Operator A revenue is increasing with the increase of number of VAS subscriber and VAS subscribers average usage .In the figure 10, we can see that the operator revenue at first is increasing and then decreasing.

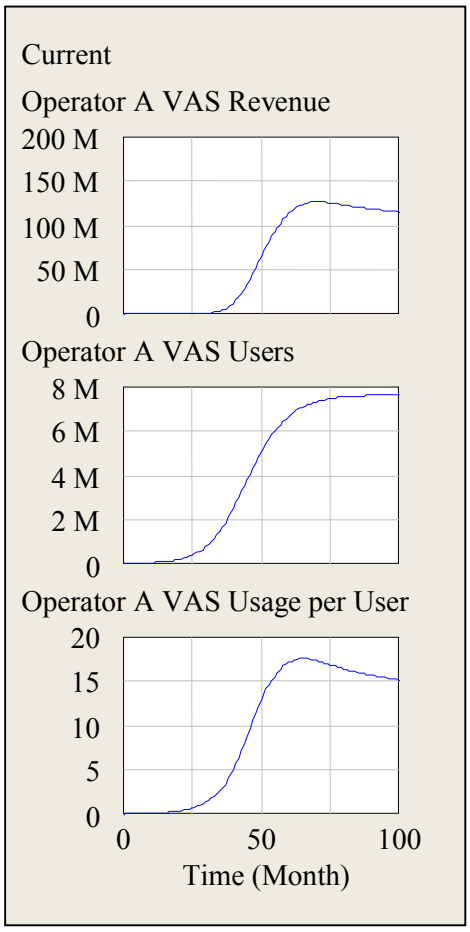


Figure 10

The reason for this behavior can be understood with the observation and analysis of the behavior of effective factors as shown in figure 10. The main reason of operator revenue decrease is related to decreasing subscription in operator network from one hand and reduction in revenue per subscriber from other hand. The reason for reduction in revenue per subscriber can be sought in figure 11:

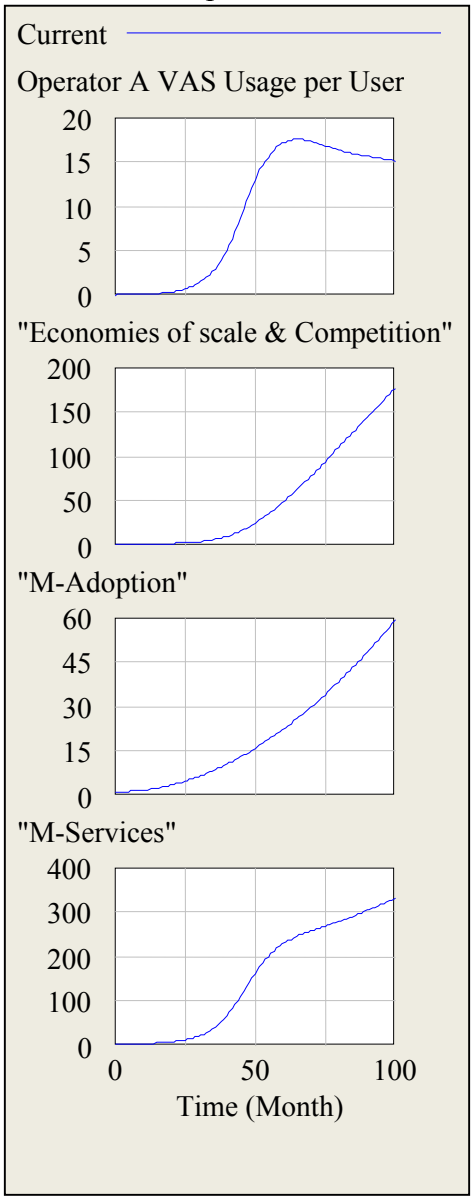


Figure 11

As can be seen in figure 11, the factors like mobile phone VAS adoption (M-Adoption) in the society and the volume of operators' services using VAS (M-Services) is increasing which cause an increase in subscriber average usage, however, two other factors including competition and economy of scale result in reduction of subscriber average usage. In our suggested model, these two contradictory factors have been considered and formulated.

7– Policy Analysis

Two variables which can affect the revenue of operators are the "subscriber average usage of VAS" and "the number of VAS subscriber ".As the maximization of revenue of operator is the target of this model, so two policies can be considered. The first policy is attempting to affect on the first variable and the second policy affecting on both two variables. In the proposed model, some real world conditions have not been considered due to model assumptions. Two example of these real world conditions are price reduction and market development. In fact, due to perfect competition assumptions, we supposed service prices as stable. Market development policy can not be applied due to proposed model assumptions as well.

Hence, two following policy can be deduced and proposed:

7-1-Advertising and communicating policy for operators' VAS:

This policy is applied to model through Operator A VAS Advertising variable and result is shown in the following diagram (fig.13):

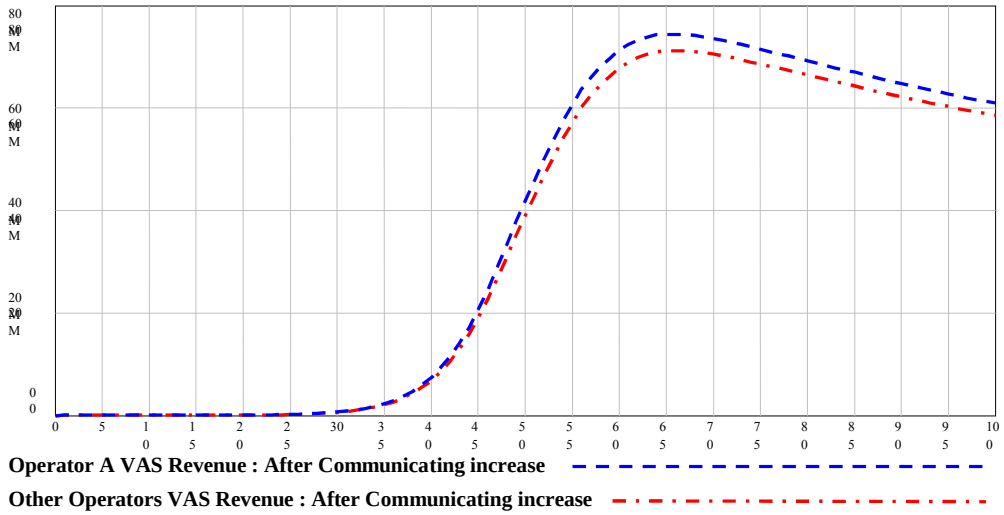


Figure 12

As indicated in diagram (fig.12), in similar condition, this policy will increase the revenue of Operator A in comparison to other operators. The following diagram (fig.13) is suggesting the Operator A revenue before and after the increase of Operator A VAS Advertising variable.

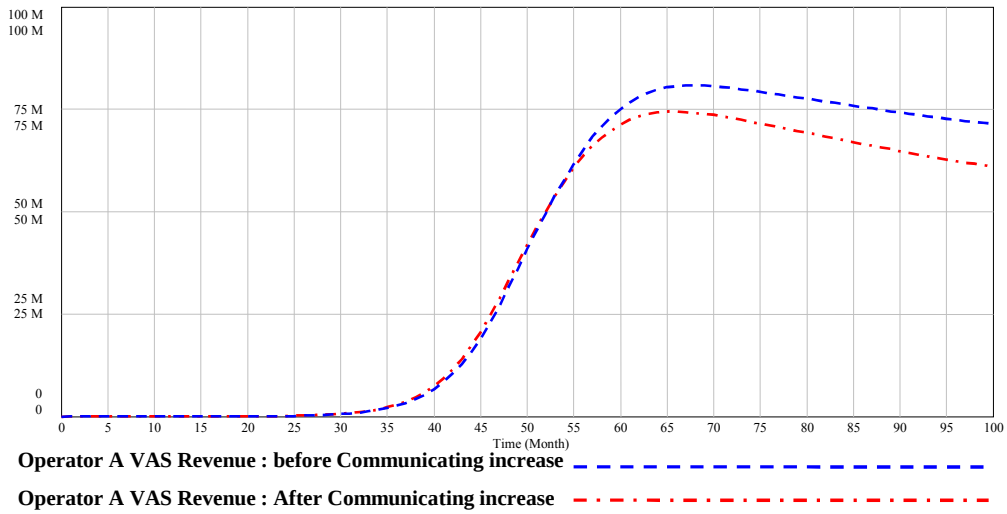


Figure 13

Operator A revenue at first is increasing and then decreasing on which the following results can be deduced:

- According to dynamic hypotheses & model assumptions, the operator advertising not only will give rise to increased VAS usage rate among opeator subscribers, but also incease the VAS adoption in society which is beneficial for all operators.

- Increased VAS usage rate and M-adoption will result in increased revenues of operators, nevertheless, increased competition and economy of scale will have contrary and decreasing effect on revenue.

Due to decreasing effect of advertising and communicating policy, this policy should handle with care and be up to a level with which both of our targets including increased subscription and avoiding price war will be satisfied.

7-2 – Operator's particular M-service application:

Another policy which can be applied is about the M-service offer by operators themselves. These M-services is regularly offered by some other independent companies which their M-services are delivered on the basis of operators' network. Operators, themselves, can offer these M-services through different ways, e.g. through entertainment services or news service or through an agreement with M-services companies. In any case, the operator should deliver these services and reserve it as a relative advantage for itself against other operators.

For implementing of this policy we need to change our model as depicted in the following figures (fig.14 &15):

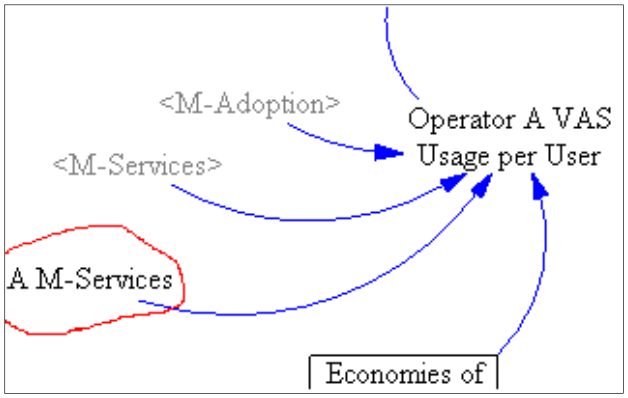


Figure 14

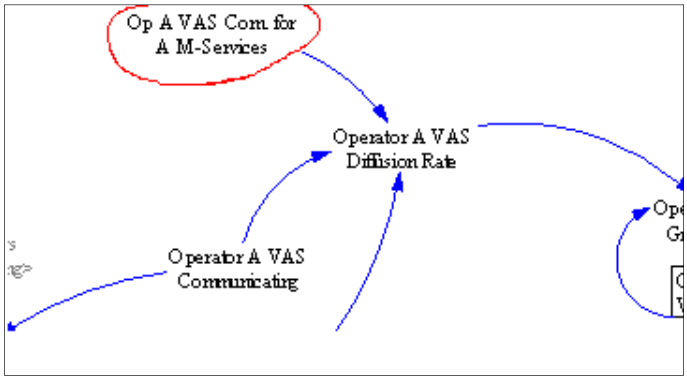


Figure 15

As shown in above figures, two changes have been applied to proposed model. In figure 14, M-services of Operator A is introduced and in the figure 15, the advertising of these services applied. The result of implementing of this policy is depicted in figure 16:

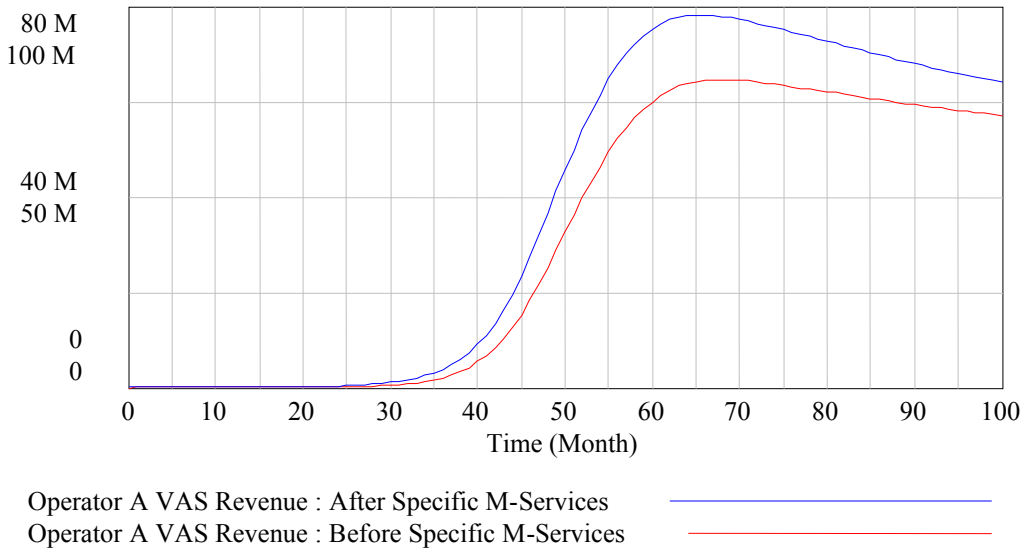


Figure 16

As shown in the diagram (fig.16), this policy can increase the revenue of the operators through two ways:

First, M-service usage increases VAS average usage rate of Operator A, without positive effect on the other operators VAS usage rate.

Second, the advertising of these services will result in operator A VAS prevalence rate increase without any effect on general M-adoption and other operators.

8- Conclusion

- Due to rapid changes of Telecom industry regarding market and technology, companies in this industry definitely need to some powerful instruments to analyze their businesses effectively and profitably. System dynamics is within these powerful instruments especially in Telecommunication.
- The future of mobile phone market is considered for mobile VAS and mobile data. According to proposed model and its behavior in this article, the competition in this industry has complicated dimensions, e.g. Advertising can backfire and carry negative effects on the operators market as resulted in first policy, however, using VAS value chain which indicated in the second policy can establish competitive advantage for operators.
- In this article, our study concentrated on some parts of VAS Value Chain for the benefit of operators; however, there are plenty of rooms to work on other dimensions of VAS Value Chain to get the fullest benefit out of this concept for this industry.

9- Acknowledgement

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