

Abstract

Savitar presents an analysis tool for evaluating a player's business case options in context of 2G auction. Analysis is a numerical estimation of business value based on interplay between the Spectrum Auctions and market structure for each service area in a model with several incumbents and several potential new entrants. The focus is on the competitiveness the Player inherits by playing in the market and their potential to sustain their business value as changes happen. Under plausible conditions we derive representative empirical expressions which help the player in choosing best service areas and strategies to maximize value while controlling the downside risks. We consider the internal inertia of the operator in generating business value and also occurrence of internal strategies and likely external events in forecasting the post-auction business performance. The goal of the model while building strategies is to determine Economic efficiency of a player. The model exhibited quite accurate results when tested with the performance of major operators in the country.

Solution objectives:

- a. Develop an empirical representation of business of an operator in a given service area in time continuum with model trained to inertia of primary determining factors –business fundamentals, and forecasted impact on these factors based on likely future events*
- b. Present a multi-player bid process simulation that can help evolve a set of operator strategies for overall service areas participation using empirical expressions of business and dynamic influences on them during the evolving bid process scenarios*

Usage objectives:

- a. The solution can be used out of package to drive strategic objectives using the default Savitar derived expressions*
- b. The solution should present itself as a highly interactive & easy to use tool and adapt itself to player's view point to shape situational objectives and understanding of market conditions*
- c. The solution should show a convergent means to a strategic objective (such as NPV) throughout the process i.e., expression adaptation, future strategy and influences, bidding etc.*

Users:

- Business Analysts: Evaluate risk of investment*
- Incumbent Operators: Minimize business value erosion*
- Whole sale operators: Evaluate the business value and risk to timely returns*
- MVNOs: Strategize on service areas for best returns*

Out of package contains:

- Default models for majority players and collective majority in each service area*
- Strategy mapping tool*
- Multi-player bid process simulation in conjunction with strategy analysis*

Introduction:

In current context of second half of 2012, Supreme Court has invalidated the 122 licenses granted in 2009 primarily in 1800MHz band that is to be used for services using 2G technology. These bands of spectrum are to be re-auctioned through a bid process by August 2012. Players who participated in earlier 3G auction have overestimated the business value resulting highly leveraged balance sheets. The participants in current 2G auctions will have to adjust to a new real value of spectrum price. Incumbents also need to re-work their balance sheets because an equivalent price is expected of them.

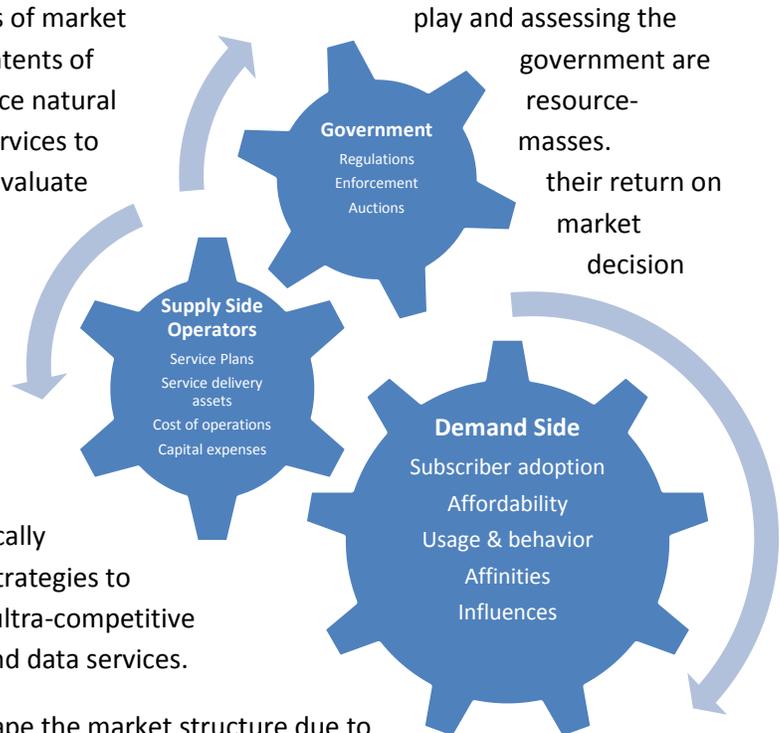
Regulators are constantly framing the rules of market auction reserve price per MHz. The twin intents of to extract its perceived fair value for a scarce natural spectrum, and also to ensure affordable services to Challenge for investors is to continuously evaluate investment with changing regulatory and dynamics. Our offering is to empower makers with the ability to visualize and evaluate their business value and economic efficiency in time.

This model presents a rational basis for evaluation of continuous business value. Operators can systematically and methodically determine the business value and evolve strategies to preserve the bottom line in a mature and ultra-competitive business such as in India's 2G voice, VAS and data services.

Proposed 2G Spectrum Auctions may reshape the market structure due to a new 'normal' of fundamentals. As a consequence firms competing for spectrum are indifferent about the final form of the market structure (i.e., how many competitors and which other competitors are going to win). The new 'normal' will also be shaped by consumer's willingness to absorb some of the cost. Alternative technologies such as 3G and 4G are expected erode the high end segments. The tool allows for these predictions to be factored in from player's view point.

Players having their own strategies and goals prior to the auctions but face many difficulties in putting it into perspective of a dynamic future market model. Also, it is a tough task to adjust the pre-bidding plans based on the on-going bid status, process different strategies and take decisions during the auction process for each circle in each round in a limited time imposed by auctioneer. This tool presents strategic analysis at each step based on player inputs.

A multi-player (Player, Auctioneer & Competitors) bid process simulation is included for the player to hone their strategies prior to bid-process and optimize their outcome during the bid process.



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General Approach for deriving economic expression:

There are two types of empirical expressions¹ of 2G business models are possible for a given service area based on observable data available through reliable and verifiable sources:

- a. A majority player whose fundamentals can be determined with reasonable certitude and would be a significant player in the service area
- b. A collective majority whose fundamentals determine the market landscape of the service area

The empirical expression is developed based on identifying the factors which control the player's output in a given service area. A detailed analysis is carried out in identifying these factors. Some of the basic factors can be like subscribers, coverage area, call costs, etc. Besides the basic factors which affect the Player's earnings, the model takes into consideration complex influencing or indicative factors for the business such as Regulations, Competition from other operators or technologies and generally available proxies.

Once empirical expression is trained, forecasting can be done with the inherent inertial economic efficiency of the Player in that market. Expression is retuned continuously as and when new data is acquired.

Limitations:

This model assumes that the market business depends linearly on the factors affecting it. Such linear approximation is justifiable given the mature fundamentals of the 2G market in India. Non-linearity would exist in short durations and can be corrected as new data points are added in future time intervals.

Though the model forecasts reasonably accurate values as verified in validation step whenever changes occur, data availability from verifiable sources makes its impact. The missing points in the data have been interpolated/extrapolated using algorithms.

The user's ability to forecast correctly to their situational view point is easily enabled in the tool. Much of Player's internal or trusted analyst data can be exploited for additional factors to enhance the accuracy.

Validating the training curve:

The model has been trained initially using the previous performance statistics of the operator. The established training curve is validated by removing some intermediate data points randomly and the removed values are imported from the Training curve. The substituted data points matched the actual values quite satisfactorily in Savitar's models.

¹ Empirical expression in the context of this white paper refers to 2G business models in India. Even though DOT regulations may allow other business models to evolve in usage of spectrum, only Voice, Data and VAS per current scheme of service models by 2G operators are covered. New schemes may require additional analysis.

The data:

Primary data sources for models were obtained from Indian government sources such as Census of India, Department of Telecommunications (DOT), Telecom Regulatory Authority of India (TRAI), Wireless Planning & Coordination (WPC) Wing of the Ministry of Communications. Data from Industry bodies such as Global System for Mobile Communication Association (GSMA) and International Telecommunication Union (ITU). The Subscriber data is collated from Cellular Operators Association of India (COAI) and Association of Unified Telecom Service Providers of India (AUSPI). Finally, financial results published by publicly listed incumbent operators. Savitar has access to 3rd party data such as mapped telecom assets which have not been used in the current default models.

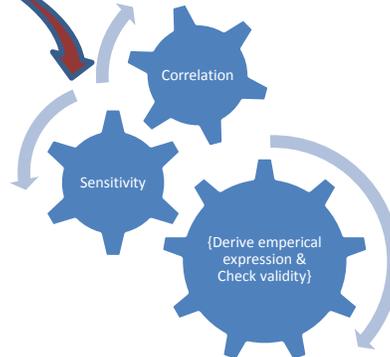
Most of the data available from the above sources is related to overall performance of the country .Data related to a particular circle is limited and some predictions and interpretations are carried out. Some proxies are used in order to represent a factor whose data is unavailable. For example, accumulation of Cell site location represents the coverage area.

Add Additional Factors

<u>Internal factors</u>	<u>External factors</u>
➤ <u>Cell Site OPEX</u>	➤ <u>Policies & Regulations(TRA)</u>
➤ <u>Subs per cell site</u>	➤ <u>VOIP policy change</u>
➤ <u>Planned M&A</u>	

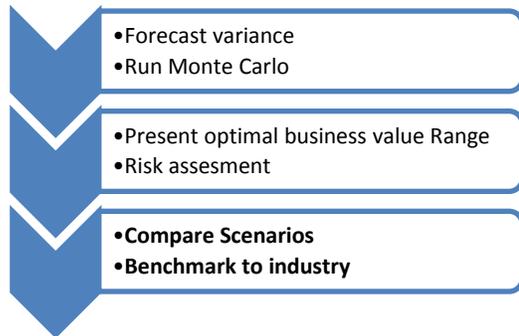


Retune & Train Model



Create Scenarios

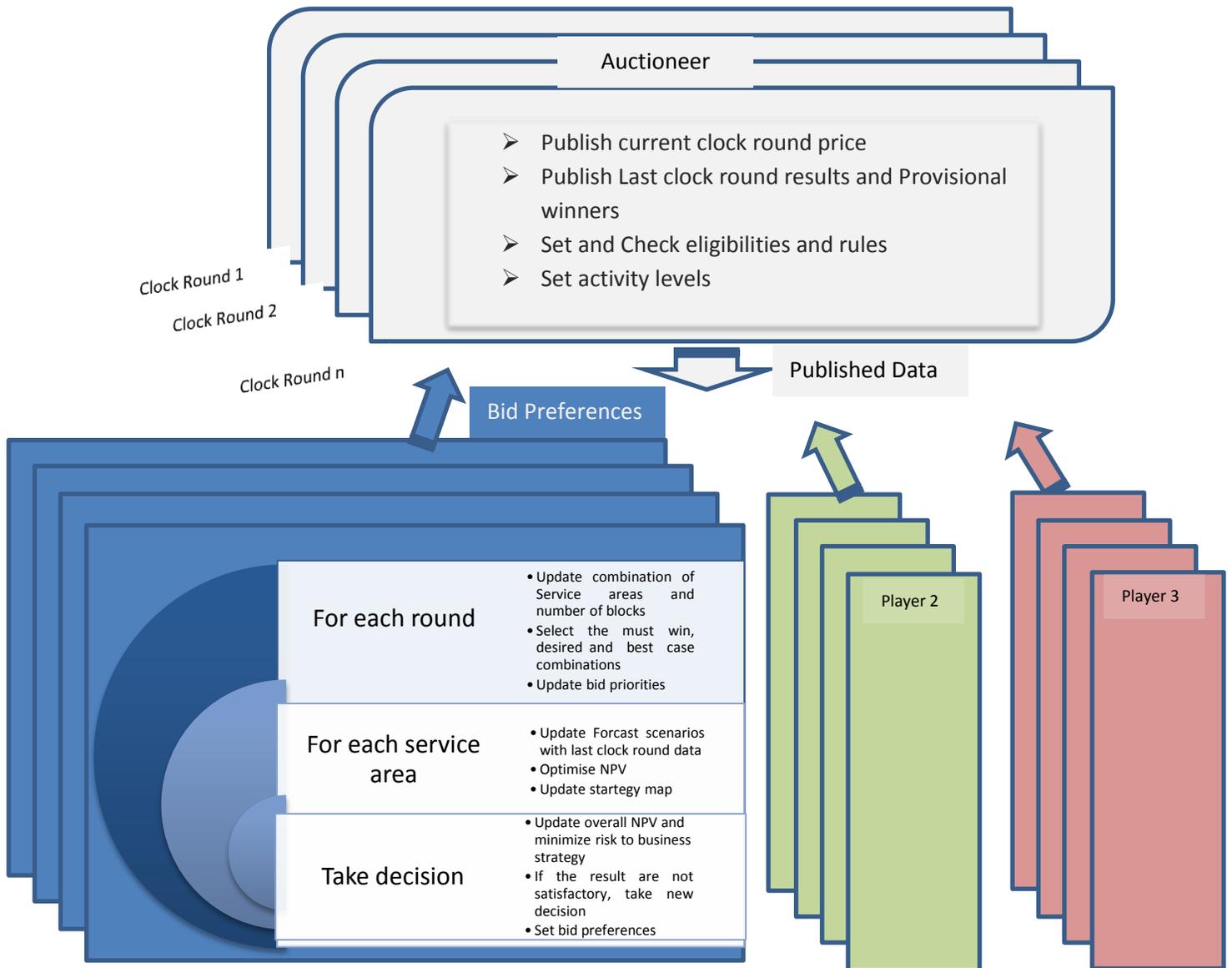
<u>Internal factors</u>	<u>External factors</u>	<u>Risk Factors</u>
➤ <u>Spend plan</u>	➤ <u>Policies & Regulations(TRA)</u>	➤ <u>Churn</u>
➤ <u>Churn reduction</u>		➤ <u>Price erosion</u>
➤		



BIDDING

This bidding algorithm is simple and user friendly. It is presented as a multi-player game that simulates actual bidding process. It is in perfect alignment with auctioneers 3G and BWA bidding process. However, it can be adapted to a new bidding process if DOT changes the rules. Also, in conjunction with the previously developed strategy, it can be used as part of the actual bid participation.

This algorithm allows us to bid optimistically given the Player’s strategy and situational view point. The forecasting scenarios in the algorithm guide the Player to make decisions during every step of the bidding process. The default model emphasizes on protecting and maximizing NPV while minimizing the risk to assumed business strategy in preparation for the bidding.



Examples of strategy play

1. Holdup strategy

Assume that there is a mutual understanding between two players pertaining to a service area and thereby overall set of service areas, it is better if only one of the players competes in that service area and acquires the required spectrum. If both the players compete, they increase the demand which in turn increases the spectrum cost. The obtained spectrum can be shared between the players after the auction is done. This strategy can be played if there is a mutual understanding between the players to play to their strengths in each service area. Interpretation of DOT's bidding participation rules prohibit such an open collusion.

2. Parking strategy

As per the activity rule, a bidder has to maintain his eligibility criteria throughout auction process. According to the parking strategy a bidder maintains eligibility by parking its eligibility in particular spots that the bidder is not interested in and then moves to his true interest in later stages of the bid process. By this strategy a bidder can reduce the demand and spectrum costs of the interested service areas. Given the maturity of understanding market models of 2G services in India, this strategy will not last beyond few initial rounds as the activity rules get tighter.

3. Other Strategies

Savitar's tool offers a basis for evolving strategies that are advantageous to their situational view and internal business fundamentals. For example, protecting an Net Present Value strategy in a time continuous method.

Results and conclusion

The work presented in this paper proposed an empirical methodology for estimation and forecasting the 2G telecom market dynamics in India. It helps the operators to profitably bid for the desired service areas and their corresponding spectrum blocks such that the bidder is always in a risk minima position during the auction. Such an empirical derivation is feasible because of maturity of the market and its fundamentals

The tool is web based for easy deployment and secure communication within the intranet of the Player's company. This also ensures sufficient resources to accomplish intra clock round analysis for complex strategies and scenarios during the auction rounds.