BUILDING A PREDICTIVE MODEL TO DETERMINE PROBABILITY OF SUCCESS IN DEVELOPING A SUBMARINE CABLE SYSTEM

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Abstract: There are many quantifiable factors that help determine whether or not a planned system enters service. Using a comprehensive data set coupled with refined statistical analysis, it is possible to develop a predictive model to determine the probability over time of a given system developer's chance of success.
To develop such a predictive model, several key factors must be identified to determine historical trends. After these trends have been identified, it is then possible to predict the relative success of system development. The primary factors to identify in the predictive model include the following:

- Time from announcement to Contract in Force (CIF)
- Time from CIF to start of Marine Route Survey
- Time from start of Marine Route Survey to start of Manufacturing

Trends can then be determined on either a quarterly or month-to-month basis – e.g., "Every additional quarter between announcement and CIF decreases success chance by X percent". Where possible, regional adjustments can be applied, and other potential indicators identified in the predictive model with a similar trending process being utilized.
This paper will discuss how a fully developed model will allow analysts to track various project milestones, as well as accurately predict over time whether a submarine cable system will enter service or not.

1. CONCEPTUAL MODEL

It is typically believed that once a system is Contract-in-Force (CIF), it possesses all the financing it needs to design, manufacture, install and commission a submarine cable system. But recent practice has also shown that financing is provided in stages and few "blank checks" are offered at the outset of a system development. Assuming there are five gates in the financing of a system, namely initial announcement of system, CIF, start of marine route survey, start of manufacturing and commissioning / Ready for Service (RFS), a conceptual model to determine the probability of success in developing a submarine cable system is as follows:

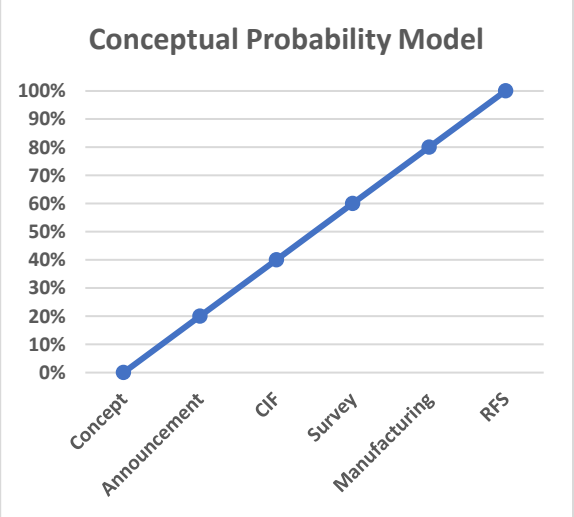

Figure 1: Conceptual Probability Model

2. METHODOLOGY

The following methodology was applied in developing a predictive model:

1. Using the SubTel Forum Cable Database, data was compiled for submarine cable systems (Name, RFS) for RFS years of 2015, 2016, 2017 and 2018, including cable systems that failed to mature and become reality.
2. Using the SubTel Forum website search feature, the applicable system within chosen RFS years were searched and first dates registered were noted for each of the following notices:
    a. Initial Announcement of system
    b. CIF
    c. Start of Marine Route Survey
    d. Start of Manufacturing
    e. End of Commissioning / RFS
3. The applicable number of days were then calculated in these corresponding fields.
4. For those fields without a date, they were logically addressed as necessary to maintain the model, but also noted within the data table.
5. A predictive model was created from the table of data using a probability breakdown showing X percent of systems achieve CIF if they are announced publicly and then Y percent make it to the next stage.

3. THE PREDICTIVE MODEL

Using the Srivastava method and in order to understand the strategic areas to be considered in the model, the process of predictive analysis was divided into four parts: (Srivastava, 2015)

1. Descriptive Analysis
2. Data Treatment
3. Data Modelling
4. Estimation of Performance

As such, a predictive model was created with the data gathered from the submarine cable database and newsfeed. The following formula calculates the probability (y) of making it to each phase (concept (x=0), project announcement (x=1), CIF (x=2), survey (x=3), manufacturing (x=4), commissioning (x=5)).

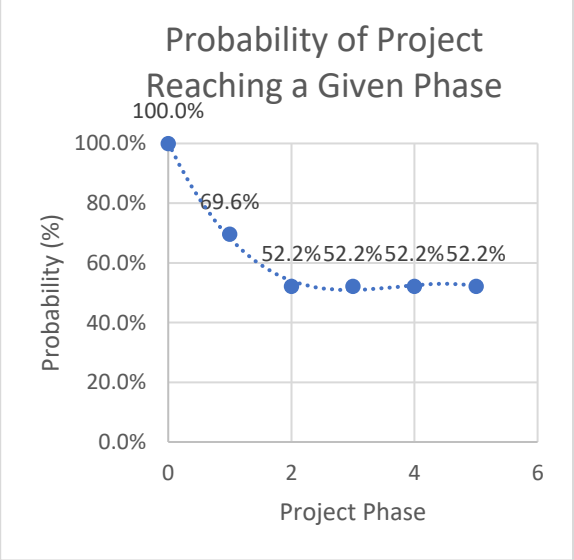

Figure 2: Probability of Project Reaching a Given Phase

This formula is 99.6% accurate (R value) for the currently available data set.

4. RESULTS

Using this predictive model one can determine the probability of success for a developing submarine cable system over the life of its execution. The following results were realized using this predictive model:

- 52.2% of planned cable systems can be expected to achieve CIF
- Once CIF is reached, it is nearly guaranteed for a planned system to reach the RFS stage
- Marine surveys sometimes begin/complete before an official CIF announcement

- OTT driven systems typically roll announcement, CIF and manufacturing into a single announcement – though more data is required to determine this conclusion with confidence
- The following average times to reach the start of each phase were observed:
    - Announcement to CIF – 393 days
    - CIF to Survey – 159 days
    - Survey to Manufacturing – 381 days
    - Manufacturing to RFS – 559

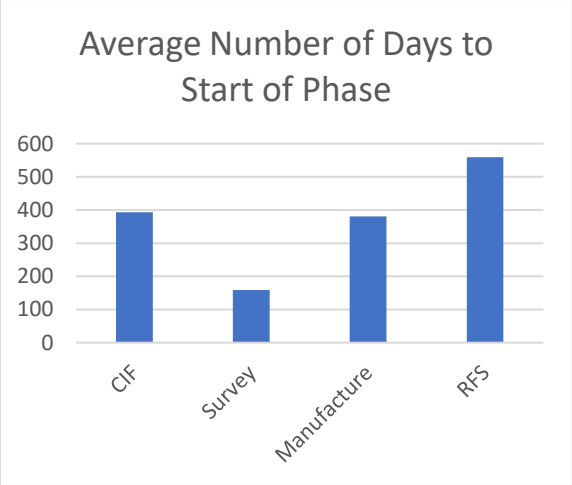

Figure 3: Average Number of Days to Start of Phase

5. CONCLUSIONS

A predictive model can determine the probability of success in a developing submarine cable system over the life of its execution. A "scoring" of a system over its execution life allows for a better understanding of its likelihood of successful completion. As such, systems can be scored, compared and analyzed.

This first attempt at modeling probability highlighted the need for additional datapoints to more accurately track probability leading up to the CIF stage. Knowing the number of days spent negotiating for all projects that do not achieve CIF would allow for development of a formula showing the risk of not securing funding week by week or month by month.

Further, a formula could potentially be derived to forecast how long each project phase will take based on relative project size. In short, a fully developed model will allow analysts to track various project milestones, as well as accurately predict over time whether a submarine cable system will enter service or not.

Additionally, while "blank checks" for the entirety of a system are no longer the norm, those systems that do achieve the CIF milestone will reach RFS nearly 100% of the time. Determining whether this is simply a result of more stringent financing standards, better project oversight or CIF being the only true hurdle requires further data gathering and modeling.

Cooperation of third parties – especially cable owners and financiers – will be necessary in order to gather accurate data to expand upon and refine the initial predictive model. Such a tool would be of great potential value to both an investor when deciding whether to invest in a certain project or to a cable developer looking to avoid or mitigate potential project roadblocks. However, much of the data required for further development of the predictive model is generally considered sensitive and confidential by normal industry standards.

6. REFERENCES

[1] Srivastava, T. (2015, September 18). Perfect way to build a Predictive Model in less than 10 minutes. Retrieved from Analytics Vidhya: https://www.analyticsvidhya.com/blog/2015/09/perfect-build-predictive-model-10-minutes/