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Pricing Telecom Infrastructure in a Monopolistic Market: A Novel NPV-based Approach

by

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Pricing Telecom Infrastructure in

Telecom Infrastructure (TI) services deliver telecom infrastructure on demand (as and when needed) in such a way that customers neither incur the high fixed costs of building the required infrastructure on their own, nor commit to long-term fixed-price outsourcing contracts. Instead, they receive the basic infrastructure they need and pay only for what they use. They can lease it (say towers to house antennas or ducts for laying fibre optic cables [1]) for a long time and ramp it up internally (say, by adding new antennas or new fibre strands as per the demand) either without incurring any extra leasing cost or at the cost of a nominal additional lease price (i.e., economy of scale). In fact, TI services industry represents a marked departure from the current ways of doing legacy telecom business. On one hand, they feature attributes that appeal to customers: short lead times in service provisioning, high reliability and survivability (a duct has an average lifetime of 20 years; a fibre has a very low error rate ~ 10^{-9} [1]-[3]), customized service level agreements, a reduced learning curve in the adoption of a new service (say voice-over-IP (VoIP)), and easy access to new technology (such as (WDM) [3]). On the other hand, TI services have direct financial benefits for the customer. *First*, TI services reduce the risk faced by the corporate (high-volume) customer because the costs to the customer are proportional to the portion of TI hired by him and the time interval for which that is hired (say, a year). These two are usually correlated with the number of transactions anticipated by the customer to be

given their monopolistic "right of way" in a pseudo-regulated environment. Limiting our discussion to a TISP that provides only fibre optic platform, we shall try to answer the following questions.

Should a duct include guarantees on pits and/or fibres? Should the service offer duct and fibre separately, or should these two types of offerings be bundled as a single service? Notice that

to the duct and building any extra pit (for distribution/maintenance) will incur extra one-time plus extra recurring charge (as applicable for fibre-pair per duct-Km) payable to the TISP. This will certainly force the consumers to restrict themselves within 'n' fibre pairs and 2 pits as long as possible. So we need to carefully find the optimum value of 'n' such that it neither hinders the growth nor harms the life of the duct (taking out 12 pairs and then putting 24 pairs will cause some wear/tear to the duct). Currently possible values for 'n' are 12, 24, 48 (more than 48 are probably not feasible through 40 mm duct right now). Let us consider 24 to be the optimum number given the current growth pattern, i.e, n=24.

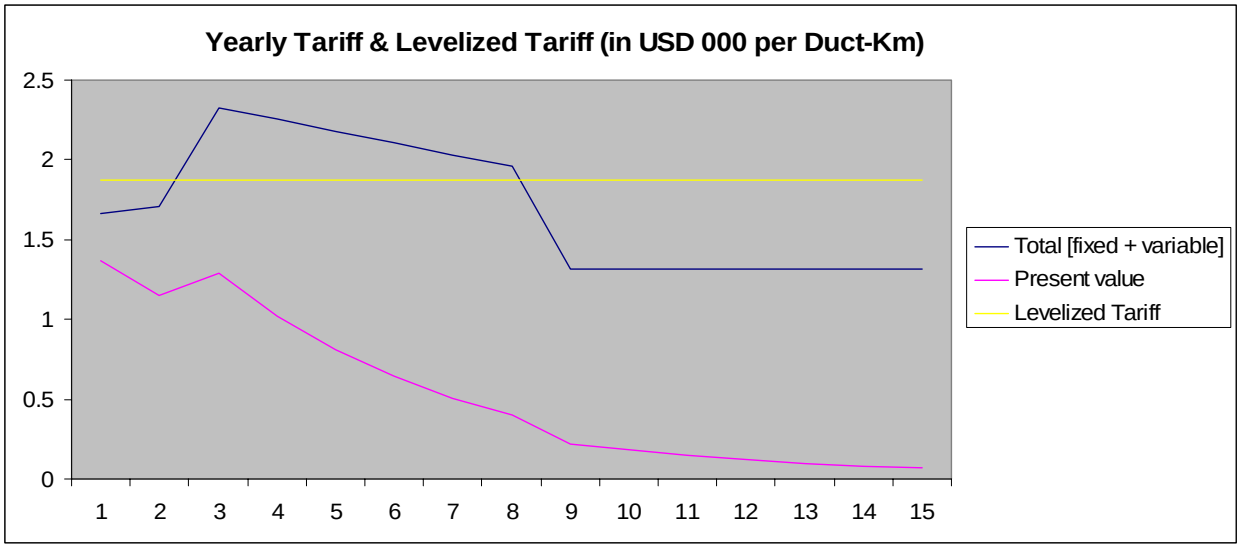

Fig1. Tariff per Duct-Km.

To find the annual usage fee, we notionally relate bandwidth (BW) to plot area in the following way. We assume that the BW usage will be minimum in the residential areas where each household of size 2,000 sq.ft. will consume about 1 Mbps BW in the present condition (this is an indicative figure only to show the calculations). Currently, one pair of fibre is capable of carrying at least 1 STM i.e., 155 Mbps [1]-[3]. So, in terms of sq. ft., one fibre pair can cater to 155*2000 =310,000 (or, roughly 300,000) sq. ft. Therefore, annual usage fee (i.e., connectivity charge) for one fibre pair should apply to 300,000 sq. ft. only; if this license fee be USD 300,000 then this translates into USD 1/sq. ft. as the granular usage fee. This microscopic view is necessary because it is always advisable that a TISP attempts to price its offerings in such a way that it becomes attractive to both the high (wholesale consumers of ducts wherein they will put their fibre) and low (retail consumers who will be interested in one pair of fibre-in-the-duct only) segments of customers. A customer of the TISP should pay the usage fee (for lighting the dark fibre pairs through the duct) in terms of sq. ft. of the plot it is serving to. This will put the usage fee in direct proportion to the business growth of the customer which will not object much because it does not have to shelve out any anticipatory cost. As the high-end consumer's business grows, license fee increases too. After the capacity of the existing fibre pairs exhaust, demand for more fibre-pair and/or pits are expected to grow. So the TISP can catch them at this point and charge their demands at some premium rate in order to virtually share their profit in a secondary manner.

Alternative -I

	Offering Type	***One-time charge (in USD)***	***Annual maintenance charge (in USD.)***	***Annual usage fee (in USD)***
1(a)	One Duct-Km (40 mm) for 10 years <say, for plot type C i.e., USD 7,500 per 1000 sq. ft.>	13,300 (includes (i) permission to draw maximum 24 pairs of fibre, (ii) one entry pit and (iii) one exit pit)	2,000	1000# *[per 1000 sq. ft. per fibre pair lit]* (includes permission to serve 1000 sq. ft. with one lit fibre pair)
(b)	Permission for drawing additional 12 fibre-pairs per duct-Km during duct purchase	6,840**	1,000	1000
(c)	Permission for drawing additional 24 fibre-pairs per duct-Km during duct purchase	8,550*	1,880	1000
(d)	Permission for every additional Pit/Termination (One unit)	2,350	120***	
2	One Fibre-pair per Duct-Km****	1,000 (includes duct and pits)	550	1000
3	Entry pit	NIL	120***	

Note:

* Excludes cost of duct (USD 4000) and capex of an additional pit (USD 750).

** In order to discourage clients from taking additional 12 fibre-pairs, the one time charge is pegged at 80% of 24 fibre-pairs one-time charge.

*** Maintenance charges are estimated at roughly 5% of one-time charge of additional pit.

***** It is assumed that the TISP will draw 48 pairs of fibre in duct when it will retail out fibre-pairs to players like cable operators

\# One household will need 2 Mbps from one fibre pair which when lit up may provide up to 155 Mbps.

Alternative -II

	Offering Type	***One-time charge (in USD)***	***Annual maintenance charge (in USD)***	***Annual usage fee (in USD)***
1(a)	One Duct-Km (40 mm) for 10 years <say, for plot type C i.e., USD 7,500 per 1000 sq. ft.>	13,300 (includes (i) permission to draw 24 pairs of fibre, (ii) one entry pit and (iii) one exit pit)	2,000	1000[#] *[per 1000 sq. ft. per fibre pair lit]* (includes permission to serve one 1000 sq. ft. with one lit fibre pair)
(b)	Additional 12 fibre-pairs per duct-Km, ∂ years after the initial duct purchase	NIL	(1,000+ (6,840/ (10-∂))*	1000
(c)	Additional 24 fibre-pairs per duct-Km , ∂ years after the initial duct purchase	NIL	(1,880+ (8,550/ (10-∂))*	1000
(d)	Every additional Pit/Termination (One unit)	2,350	120	
2	One Fibre-pair per Duct-Km	1,000 (includes duct and pits)	550	1000
3	Entry pit	NIL	120	

Note:

* One time charge, as estimated in Alternative I, is amortized over (10-∂) year period in annual recurring charges. It is felt that imposing one-time charge for additional fibre-pairs may act as a deterrent.

VII. Conclusions

In a world that is changing so thoroughly because of the impact of telecom services, the pricing of TI that help provide these services plays an important role. Of course, a price must recover cost and generate profit; but that is only one of the many important reasons for pricing. In TI business, once an infrastructure (say duct) is built, the construction cost is largely a fixed cost, and the variable operating cost can be extremely small. But the opportunity cost may be high. At the same time, given a set of committed customers, the infrastructure can sell at a price that reflects its value to the customers rather than its production cost per se.

However, in a protected monopoly, prices tend to be usually based upon potential, rather than actual. Moreover, if it is for a TISP catering to an upcoming township, it is partially notional too

as past data is not available. So a TISP should aim to price its TI attractively so as to stimulate demand, build customer base and catalyze network externality effects. Otherwise, it will always suffer from the problem of profit maximization. Since it is the only supplier of TI in this case, it is almost free to choose price (under the monopolistic condition), depending on the identity of the customer (in terms of the type of plot the customer is capable of serving) and also on the amount purchased by the customer. The TISP can offer quantity discounts sometimes. Since market segmentation (classes of customers) is not much clear at this point of time, the TISP should spell out a set of offers and then each customer can choose the offer he likes best. If prices are nonlinear, being defined for different quantities, it automatically takes care of "*quantity discount*" and "*bundling*" easily.

References

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