

APPENDIX B – Application of the methodology of Chapter 4

<Predicting the Future of the Softbank Group>

Cooperation Model is applicable to the calculation of the corporate value. When there are two agents i.e. x and y . Here is the very convenient equation (b-1) that instantly gives you the combined value (V) of the two agents.

$$V = 2K/(1 + \alpha) \quad (b-1)$$

K is carrying capacity and α is the cooperation coefficient. When $K=80$ and $\alpha = 0.5$, the combined value V will be:

$$V = 2 \times 80 / (1+0.5) \doteq 106$$

When α is negative, -0.5 for example,

$$V = 2 \times 80 / (100-5) \doteq 320$$

This formula is extendable to more than two agents (n) i.e.

$$V \doteq nK/(1 + \alpha)^{2n-3} \quad (b-2)$$

The comparison of the value obtained from (b-2) and the solutions of the differential equations for the numbers of agents at 2, 3 and 5 are shown at Table B-1.

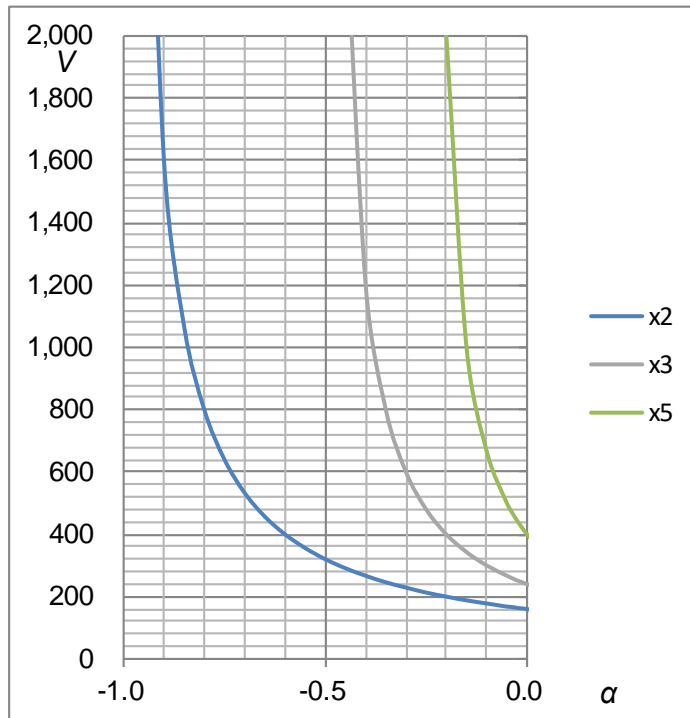
Table B-1

α	2 agents		3 agents		5 agents	
	$2K/(\alpha+1)$	Solutions	$3K/(\alpha+1)^3$	Solutions	$5K/(\alpha+1)^7$	Solutions
-0.20	200	200	469	400	1,907	2,000
-0.15	188	188	391	343	1,248	1,000
-0.10	178	178	329	300	836	667
-0.05	168	168	280	267	573	500
-0.04	167	167	271	261	532	476
-0.03	165	165	263	255	495	455
-0.02	163	163	255	250	461	435
-0.01	162	162	247	245	429	417
0.00	160	160	240	240	400	400

Now by using this formula let us predict the future value of Softbank Group. In 2010 the chairman Son announced his 30 year vision for the company (See **Growing through M&A** in **Chapter 4**). He aimed to expand the partner network up to 5,000. Thus $n=5,000$. Investment value for each partner is provisionally set at 80 million Japanese yen which is regarded as K .

How can we get the value of the cooperation coefficient α ? *Figure B-1* indicates the combined value V exponentially increases under the Cooperation Model. When $n=5000$ the exponential curve is predicted to become the almost vertical straight line.

Figure B-1



In other words even a very small α contributes to create the enormous V when the number of partners n is large. So let us simply assume α is defined as the inverse number of the digit numbers of the agents i.e.

$$\alpha = -k \times 10^{-n} \quad (b-3)$$

k is a constant and n is the digit number of the agents. In case of 5 agents, the digit number n is 1, while 5,000 digit number is 4. When constant k is 6, α will be:

$$\alpha = -6 \times 10^{-4}$$

Now all the parameters are chosen. The Softbank Group's value in 2040 (30 years after 2010) is finally calculated as follows.

$$V \doteq 5000 \times 80 \text{ million} / (1 - 0.0006)^{2 \times 5000 - 3} = 161 \text{ trillion (Japanese yen)}$$

$k = 5$ makes $V \doteq 59 \text{ trillion JPY}$

$k = 7$ makes $V \doteq 439 \text{ trillion JPY}$

End of Appendix B