HOW CAN HIGH SPEED RAILWAY SURVIVE THE COMPETITION FROM CIVIL AVIATION?

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Abstract: With the implementation of Medium and Long Term Railway Network Plan 2008, Chinese high speed railway gradually came into being. In order to cope with competition from high speed railway, civil aviation put forward comprehensive strategies including cost, big-client, on-web check-in, price and etc. Under such a circumstance, it's of great importance for high speed railway to adopt corresponding strategies to improve its core competence. High speed railway and civil aviation have their comparative advantages as to distance, speed, price, safety and energy consumption and etc. Time model shows that, within 1000 kilometers, high speed railway dominates market share because of its time saving characteristics, while above 1000 kilometers, civil aviation has comparative advantage. In order to improve consumer's surplus and gain market competition edge, high speed railway can take strategies of product, price, place, promotion, resource, competition and cooperation, knot and informationization.

1 INTRODUCTION

With the rapid development of highway and civil aviation in China, market share of high speed railway dropped signifcantly during the last two decades, see Table 1.

Table 1: Chinese railway market share

Year	Total Passengers Transported (Billion Persons)	Railway	Highway	Water	Civil Aviation
1991	8.06	11.80%	84.70%	3.24%	0.27%
1992	8.609	11.58%	85.00%	3.08%	0.34%
1993	9.966	10.58%	86.37%	2.72%	0.34%
1994	10.929	9.95%	87.29%	2.39%	0.37%
1995	11.726	8.76%	88.76%	2.04%	0.44%
1996	12.454	7.61%	90.10%	1.84%	0.45%
1997	13.261	7.04%	90.84%	1.70%	0.42%
1998	13.787	6.90%	91.20%	1.49%	0.42%
1999	13.944	7.18%	91.01%	1.37%	0.44%
2000	14.786	7.11%	91.13%	1.31%	0.45%
2001	15.341	6.85%	91.44%	1.22%	0.49%
2002	16.082	6.57%	91.73%	1.16%	0.53%
2003	15.875	6.13%	92.24%	1.08%	0.55%
2004	17.675	6.32%	91.91%	1.08%	0.69%
2005	18.47	6.26%	91.90%	1.10%	0.75%
2006	20.242	6.21%	91.91%	1.09%	0.79%
2007	22.278	6.09%	92.05%	1.03%	0.83%
2008	28.679	5.10%	93.52%	0.71%	0.67%
2009	29.769	5.10%	93.52%	0.71%	0.67%
2010	32.695	5.13%	93.37%	0.68%	0.82%

According to the Medium and Long Term Railway Network Plan 2008, by the end of 2012, Chinese railway network will reach 110,000 kilometers, double track and electrfication ratio will be over 50%, high speed railway with the operational speed over 200 km/h will reach 13,000 kilometers. By 2020, the total length of highp seed railway will be over 17000 kilomters, and the total

length of railway will be more than 120,000 kilometers, see Figure 1.

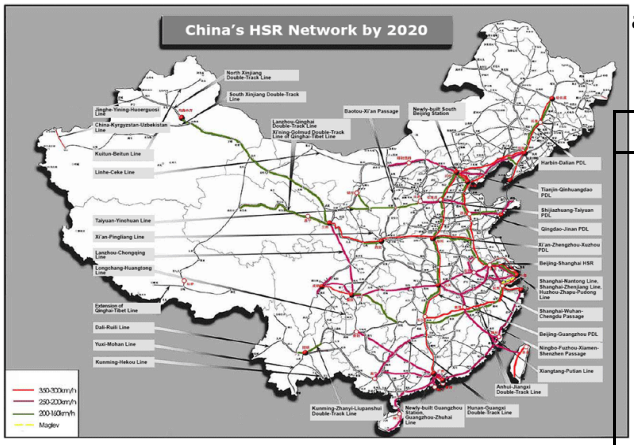

Figure 1: Long and medium term DPL plan by 2020

Chinese civil aviation put forward comprehensive measures to cope with the competition from high speed railway. It's imperative for high speed railway to adopt counter measures to survive the competitoin from high speed railway.

2 LITERATURE REVIEW

Transportation resource serves as the foundation, transportation product as the carrier, marketing as the method to achieve market competence, see Figure 2.

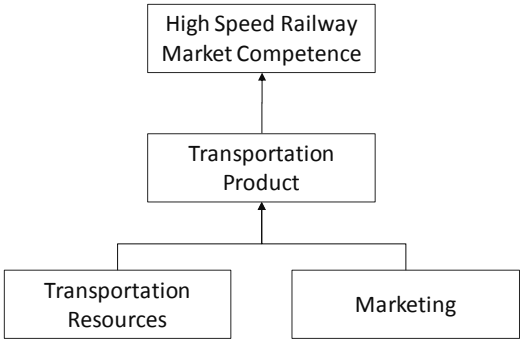

Figure 2: Theories related to market competence of high speed railway

2.1 Transportation Resources

Transportation resource includes fixed and movable transportation resources, and soft ones such as labor, information, organization and management and etc. Railway transportation resource see Table 2.

Table 2: Railway transportation resources

Resource Type	Resource Forms	
movable resource	locomotive	①steam
		②diesel
		③electrified
	EMU	
	Ferry	
	wagon	①passenger
		②cargo
	container	①20 inches
		②10 tons
		③5tons and others
fixed resource	Railway lines	①track bed
		②track
		③switch
		④crossing
		⑤bridge
		⑥tunnel
		⑦culvert
		⑧others
	station	①station routes
		②freight facility
		③passenger facility
	telecommunication and signal	
	water and electricity	
	other fixed transportation resources	
soft resource	human being	
	capital	
	organization	
	operational management	

Railway transportation resources consist of locomotive, wagon, station, communication and signal equipment and etc, and form the foundation for transportation product.

2.2 Transportation Product

Product refers to the commodity that can satisfy consumer's need and bring about utility. Product has at least 3 layers, that is, core product, formal product and additional product. Of which, core product is the direct benefit and utility given to the consumers; formal product is the external appearance and

characteristics of product including shape, mark and package; additional product is the value added services including installation, maintenance, financing, logistics and etc. It's very important for transportation industries to provide transportation product with high service quality, see Figure 3.

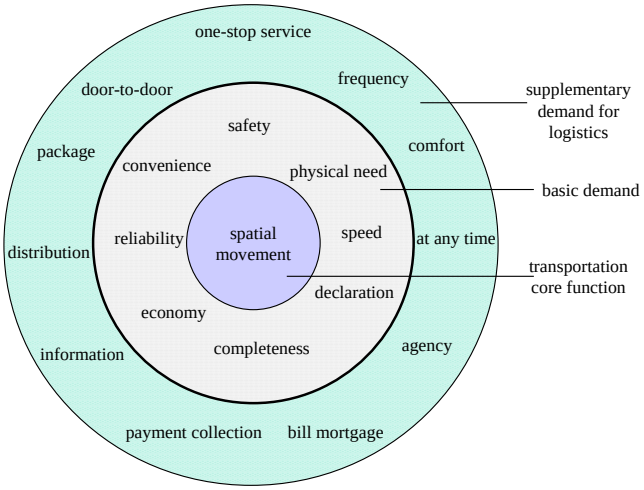

Figure 3: The importance of speed for transportation product

Other factors keep constant, travel time will be the determinant affecting people's transportation choice.

2.3 Marketing

In 1953, Neil Borden brought up the idea of marketing mix, and maintained that market demand is influenced, to some extent, by so-called marketing factors including market demand, cost, price place and promotion. In 1960s, based on marketing mix theory, E. Jerome McCarthy proposed the marketing theory of 4Ps, that is, product, price, place and promotion, see Figure 4.

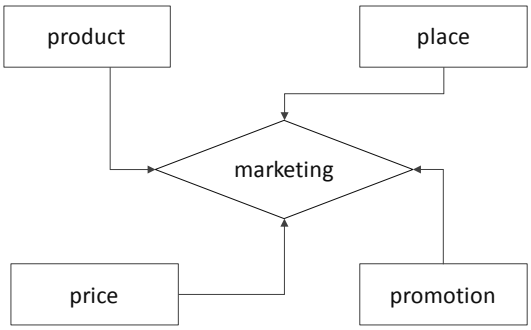

Figure 4: 4Ps

Through marketing strategies, high speed railway can reinforce consumers' loyalty and make high speed railway product a popular and welcome transportation service image and gain market competiveness.

3 SWOT ANALYSIS OF HIGH SPEED RAILWAY AND ITS BASIC COMPETITIVE DISTANCE

We first make SWOT analysis of high speed railway and maintain that high speed railway's advantage outfits its disadvantage and opportunity exceeds its challenge.

3.1 SWOT Analysis

SWOT analysis of high speed railway is shown by Table 3.

Table 3: SWOT analysis of high speed railway

Internal Environment		Score	Weight	Weighted Score	External Environment		Score	Weight	Weighted Score
Advantage	⑴high speed	5	0.10	0.50	Opportunity	⑴strong policy support	4	0.15	0.60
	⑵capable management	3	0.05	0.15		⑵implementation of Medium and Long	4	0.25	1.00

	team					Term Railway Network Plan 2008			
	(3)market oriented operational mechanism	2	0.05	0.10		(3)local government supports high speed railway financially	5	0.20	1.00
	(4)time saving within 1000 kms	4	0.20	0.80		(4)promising market demand	5	0.15	0.75
	(5)stations adjacent to downtown	5	0.20	1.00		(5)reform of Ministry of Railways	4	0.15	0.60
	(6)Harmony brand's popularity	5	0.15	0.75		(6)Increasing traffic volumes	4	0.10	0.40
	(7)professional personnel	4	0.05	0.20					
	(8)nationwide agencies	3	0.05	0.15					
	(9)perfect information system	3	0.10	0.30					
	(10)dominant market share in some regions	3	0.05	0.15					
Sub-total			**1.00**	**4.10**	**Sub-total**			**1.00**	**4.35**
Disadvantage	(1)product structure needs to be optimized	-5	0.25	-1.25	Challenge	(1)civil aviation takes comprehensive competing measures	-5	0.3	-1.50
	(2)lack of operational experiences	-3	0.20	-0.60		(2)increasing cost pressure	-5	0.25	-1.25
	(3)EMU accident of 2011	-4	0.20	-0.80		(3)inter-mode competition from highway	-3	0.2	-0.60
	(4)imperfect station infrastructure	-3	0.10	-0.30		(4)construction downsize and speed reduction	-3	0.15	-0.45
	(5)over speed of high speed railway and high cost	-5	0.15	-0.75		(5)debt payment pressure	-3	0.1	-0.30
	(6)diversified operation should be developed	-3	0.10	-0.30					
Sub-total			**1.00**	**-4.00**	**Sub-total**			**1.00**	**-4.10**
Sum of advantage and disadvantage				**0.10**	**Sum of opportunity and challenge**				**0.25**

3.2 Basic Competitive Distance of High Speed Railway

Suppose the operational speed of high speed railway is V_r while the speed of civil aviation V_a. ΔT is the time saving of high speed railway because of short travel distance of high speed railway from home to railway station and from railway station to home, and simple and convenient checking procedure at railway stations. Then, the equilibrium distance is as follows:

$$S^* = \frac{\Delta T \times V_a \times V_r}{V_a - V_r} \quad (1)$$

Of which, S^* is the equilibrium distance at which high speed railway and civil aviation spend the same time and cover the same travel range.

Consequently, when travel distance is below S^*, from time saving perspective, high speed railway is superior to civil aviation. When travel distance is above S^*, civil aviation has outstanding competitive advantage, see Figure 4.

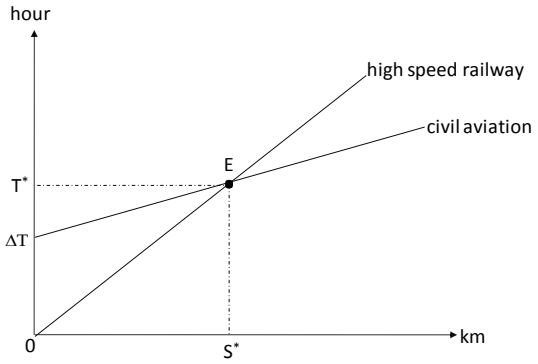

Figure 4: Equilibrium time and distance of high speed railway and civil aviation

4 STRATEGIES FOR HIGH SPEED RAILWAY TO COMPETE WITH CIVIL AVIATION

In order to compete with civil aviation, high speed railway of China can take comprehensive strategies.

(1) Price strategy. High speed railway can set price according to the market segment, peak and trough time period and quantity demanded.

(2) Product strategy. High speed railway can provide the market with diversified product service, see Table 4.

Table 4: Product strategy of high speed railway

Order	Product		
	Core	Additional	
1	• EMU operational plan	• Entertainment	• Door to door ticket delivery
2	• Time	• Food and beverage	• Guest services
3	• Connection with city transportation	• Office work	• Hotel reservation
4	• Ticket booking	• Business work	
5	• Standardized product	• Internet	
6		• Tourism	

(3) Place strategy. High speed railway has three ways to have tickets sold, that is, railway station, ticket selling agencies and Internet.

(4) Promotion strategy. High speed railway product can be known by consumers through publicity and promotion activities including advertisement and sponsorship.

5 CONCLUSION

Other parameters kept constant, high speed railway has competitive advantage within 1000 kilometers. In order to survive the competition of civil aviation, high speed railway has to improve the quality of transportation product and increase consumer's utility. Chinese high speed railway can take strategies to reinforce its market competitiveness by adopting price, product, place and promotion strategies.

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