

Analysis and Assessment of Environmental Management of Home Delivery Service by Consumers' Co-operative

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1 Introduction

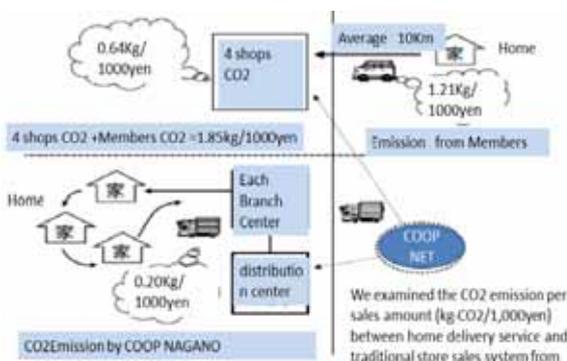
The home delivery service is important for shopping-disadvantaged areas. Our research question is whether the home delivery service is good for environment and management aspects. We examined with the data from CO-OP Nagano.

2 CO-OP Nagano

CO-OP Nagano is one of the largest COOP in Japan. It covers all Nagano prefecture, the middle of Japan. It is established 21th September 1992. The number of members is 255029.(November 2013) The capital is 11,940,240,000yen. The number of staffs is 1313. It manages foods, commodities, mutual-aid program and others. They manage store sales, delivery service and web store service (e-friends).

3 CO2 impacts between home delivery and store sales system

We examined the CO2 emission per sales amount (kg-CO2/1,000yen) between home delivery service and traditional store sales system from the data of 2007 Environmental Report.



Graph 1 Outline of COOP Nagano CO2 Emissions.

The CO2 impact of the home delivery service (0.20kg-CO2/1000yen) is less than store sale service (0.64kg-CO2/1000yen). (Graph 1) The reason is the traditional store sale style needs CO2 emissions for maintenance of store. (Ex. 24hours refrigerator system, lights and air conditioner)

4 Characteristics in shopping-disadvantaged areas

4-1 Local shopping rate in Nagano

Table 1 shows the local shopping rate in Nagano prefecture. We compared between the upper and lower ranks among cities, towns and villages in Nagano prefecture. We could find the 11% gap of average between upper and lower ranks.

Rank	City/Town/Village	Rate of Local Shopping	Rate of Organization
Upper rank	1 Iida city	92.1	19.2
	2 Nagano city	90.2	26.8
	3 Ina city	84.3	24.1
	4 Matsumoto city	83.9	18.6
	5 Ueda city	74.8	22.8
	6 Kayano city	71.7	23.7
	7 Komagane city	71.2	22.2
	8 Saku city	70.6	22.6
	9 Nakano city	70	30.9
	10 Suwa city	69	19.9
Average		23	
Lower Rank	1 MinamiAiki Village	0	28.9
	1 KitaAiki Village	0	25.7
	1 Tenryu Village	0	17.6
	4 Yamanouchi Village	0.3	33.3
	5 Sakae Village	0.8	26
	5 Aoki Village	0.8	27.5
	7 Kijimadaira Village	1	40.4
	7 Otari Village	1	29.6
	9 Miniamimaki Village	1.3	41.2
	10 Hiraya Village	1.4	33
Average		32	

Table 1 Rate of Local Shopping Nagano Prefecture (2009) 'Market Research in Nagano Prefecture 2009'

We also examined the local shopping rate among each area in CO-OP Nagano based on the

market research data in Nagano prefecture 2009. The table 2 shows Nagaike area is over 90% but Ikeda area is under 40%. The gap is over 50% even in CO-OP Nagano branches.

Center	Rate of Local Shopping (%)	Rank
Nagaike	90.2	①
Matsumoto	83.9	②
Shinonoi	76.6	③
Ihoku	62.3	④
Ueda	61.7	⑤
Suwa	61.2	⑥
Iida	58.9	⑦
Saku	46.1	⑧
Nakano	41.6	⑨
Shiojiri	37.3	⑩
Ikeda	38.2	⑪
Average	57	

We examined the data of pre-municipal merger and calculated into each center from Nagano Prefecture (2009)'Market Research in Nagano Prefecture

Table 2 Rate of Local Shopping in CO-OP Nagano

4-2 Environment and management aspects by shopping-disadvantaged areas

We compared the data from all 11 branches of COOP Nagano from the points of management and environment, CO2 impacts. We highlighted the 4 branches of highest ranked and lowest ranked branches in local shopping rate, Nagaike(No.1), Matsumoto(No.2), Shiojiri(No.10)

Table3 Ranking of Management and CO2 Emissions in CO-OP Nagano

Center	Management						CO2Emissions(kg-CO2)				Market survey	
	Gross profit	Rank	Personal annual purchase (YEN)	Rank	Rate of participating mutual-aid contract (%)	Rank	CO2 emission of car-use Kg-CO2	Rank	Kg-CO2/km	Rank	Rate of local shopping (%)	Rank
Nagaike	0.198		255,243		0.30		181,659		0.47		90.20	
Matsumoto	0.201		282,079		0.29		137,837		0.46		83.90	
Ikeda	0.205		281,086		0.33		237,631		0.31		38.18	
Shiojiri	0.210		287,286		0.33		190,180		0.35		37.25	
TOTAL Average	0.202		259,769		0.29		186,827		0.39		57.00	

and Ikeda(No.11) . We figured out the characteristics between branches with shopping-advantaged and disadvantaged area.

Table 3 shows the comparison among 4 branches from the aspects of management and environment. Shiojiri and Ikeda branch with lower local shopping rate area have totally higher ranking in management (gross profit, personal annual purchase and rate of participating mutual-aid contract). Ikeda and Shiojiri branches remark high CO2 emission of car-use but the good gas mileage (kg-CO2/km) among 11 branches. They have heavy home delivery service to cover their shopping disadvantaged areas. But they make effort to make delivery routes to pursuit high effectiveness and efficiency of gas mileage. We could find the home delivery service to shopping-disadvantaged area is an integral part of their own. Above all, the home-delivery service is not necessarily bad but preferable for management and environmental aspects.

5 Market survey to COOP members

We gave the market survey to CO-OP Nagano local group leaders for market research. We sent the questionnaires to all local group leaders 501 members by postal mail. The term is August to September of 2012. We could received

306 members reply. (61%) We tried to examine the consumption behavior in shopping disadvantaged areas. Recently we are accustomed to use internet web shopping. CO-OP Nagano manages the web shopping system, e-friends. We examined the difference of e-friends use between shopping advantaged and disadvantaged areas with chi-square test. (Table 4) We could find the 1 % significance. CO-OP members in shopping disadvantaged area use more often use web shopping rather than other areas. They use home delivery service and web shopping system to shop comfortably.

	Use of E-friends		TOTAL
	Often use	Others	
Advantaged Area	90	83	173
	52.00%	48.00%	
Disadvantaged Area	39	15	54
	72.20%	27.80%	
TOTAL	129	98	227

1% significance by chi-square test (p<0.01)

Table 4 Shopping disadvantaged area and E-friends use

Additionally we focused the consumption attitude about environmental conscious products and web shopping.

	Total	e Friends				% (A-B)
		Often use (A)		No Use (B)		
Preferentially	35	12	85	5	47	
Sometimes	174	73	78.0%	42	54.7%	23.3
Rarely	53	16	23	21	36	
Not know	39	7	21.1%	15	14.9%	6.2
No Answer	5	1	1	3	3	
TOTAL	306	109			86	

1% significance by chi-square test (p<0.01)

Table 5 Disadvantaged Area and Environment-conscious Product Purchase

We examined the difference of environmental friendly shopping attitude between e-friends user and non-user with chi-square test. (Table5) We could find the 1% significance. The e-friends site provides more information about commercial goods rather than paper base brochure. So e-friends often user can get more information about commercial goods included environmental information. The web site information in e-friends might promote more environmental friendly shopping.

3 Conclusion

We reveal the following points in this research. First, the CO2 emission by home delivery service is lower than traditional store sales. Secondly, the home delivery service is not a bad reason from the aspects of management and environment .Thirdly web shopping system, e-friends is more often used in shopping disadvantaged area rather than other areas. Above all, we could find that the home delivery service could have the possibility to solve the serious social problems in shopping disadvantaged areas. Additionally we realized the importance of further evaluations about home delivery service from the points of environment.

Acknowledgement

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