

## Number of News Articles on Various Transportation Issues

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**Abstract:** Even in today's internet era, newspapers are still thought of as indispensable information sources and to strongly influence citizens' awareness and understanding of transportation infrastructure. Accordingly, it would be beneficial for citizens to obtain information on various transportation issues easily through newspapers. However, the issue has been little investigated in Japan. Therefore, this study sought to ascertain the current state of trend news reported, to create a suggested format for newspaper companies to report transportation issues, and to develop recommendations regarding how the government uses the medium of newspapers to disseminate transportation news. News articles related to transportation in a national newspaper, a regional newspaper, and an American newspaper were extracted and compared with regard to the number of articles published on transportation issues. As a result, few such articles were found. Thus, potential measures for newspaper companies and the government to increase dissemination through newspaper articles are discussed.

**Keywords :** newspaper, trend news, citizen awareness

### 1. INTRODUCTION

In the development transportation infrastructure, the approval of citizens is highly important. Moreover, in developing infrastructure, the support of citizens, specifically their "awareness and understanding", is necessary in undertaking the proposed projects. However, it is often said today that there is a "shortage of public understanding". It is thought that mass media has a strong influence on public opinion and citizens' understanding of transportation issues. The

main forms of mass media are television, newspapers, and the Internet. In this research, we examine the diversity and reliability of information in newspapers, by extracting information from articles relating to transportation from past editions of national newspapers and a regional newspaper published in Japan, and a comparative analysis is conducted. In addition, a newspaper from the United States is analyzed in order to provide an international comparison. Thus, the current state of the news reported in each paper regarding transportation is elucidated and considered. The purpose of this research is to determine how news relating to transportation can be reported by newspapers in the future in order to deepen public understanding and raise the awareness of citizens.

## 2. DATA AND METHOD OF ANALYSIS

### 2.1 Data

Articles from five Japanese newspapers are extracted from their databases. Four national newspapers are used as sources of articles, namely, Asahi Shimbun, Mainichi Shimbun, Yomiuri Shimbun, and Nihon Keizai Shimbun, which were selected based on their circulation and sales area. In addition, Nihonkai Shimbun, which is published in Tottori Prefecture, is the one regional newspaper examined. Nihonkai Shimbun was chosen for two reasons. First, it is presumed to be the most influential among Japanese regional newspapers. Their share of newspaper circulation in Tottori prefecture is 76.7%, which is large, as shown in Table 1. Second, Tottori Prefecture is located in the southwestern part of Japan, and more expressway construction is being scheduled in this area. This area has the least extensive high-standard trunk road network in Japan. As such, this region is expected to develop more transportation infrastructure. The period for the extraction is from January to December 2006, and only the morning editions of the newspapers are used.

Table 1 Diffusion rate ranking of prefectures

Rank	Newspaper	Prefecture	Diffusion rate in prefecture (%)	Circulation
1	Tokushima Shimbun	Tokushima	85.07	252,522
2	Fukui Shimbun	Fukui	79.43	201,515
3	Nihonkai Shimbun	Tottori	76.72	160,429
4	Kitaguni Shimbun	Ishikawa	71.45	286,398
⋮	⋮	⋮	⋮	⋮
40	Ibaragi Shimbun	Ibaragi	11.74	115,826
41	Kanagawa Shimbun	Kanagawa	6.96	234,268

## 2.2 Method of Developing Database

The news articles are extracted from publishers' databases, into which around 250,000 articles are entered each year, by using fifteen keywords related to transportation issues. The article database service of each newspaper is listed in Table 2. The keywords examined in this study are Japan Railways, station, Shinkansen, railway, train, subway, car, road, taxi, vehicle, bus, transportation, airlines, airport, marine navigation, flight operation, logistics, ship, and freight. The extracted articles are read by authors one by one, so as to exclude irrelevant articles such as those about transportation accidents, vehicle development by automobile companies, corporate sales, personnel reshuffle, PR activity in station and airport by other enterprises, and articles relating to travel agencies and tourism. This extraction method confirms there is no leakage by the preparatory scan. It was examined by extracting the article beforehand for a month, and comparing with actual printed newspaper articles.

Table 2 Newspaper databases

	Newspaper	Total circulation	Domestic diffusion	Database
National paper	Asahi Shimbun	8,066,707	15.51	Kikuzou
	Mainichi Shimbun	3,973,826	7.65	Mainichi News pack
	Yomiuri Shimbun	10,032,441	19.29	Yomidasu
	Nihon Keizai Shimbun	3,040,509	5.47	Nikkei telecom21
Local paper	Nihonkai Shimbun	-	-	Nikkei telecom21

## 3. GENERAL COMPARISON OF AMOUNTS OF NEWS

### 3.1 Yearly Amount of News

We start by comparing the number of news articles during the whole study period. The number of articles and characters are calculated from the original database. The results are shown in Table 3. The amount of transportation news is measured by the number of articles during the year. Nihon Keizai Shimbun published 912 articles during the year, which is the most among the newspapers examined here, while there is no difference among the other papers. Nihonkai Shimbun has highest average number of characters per article: 775 characters. An analysis of variance is used to verify the differences between publishers. This method can analyze the difference in the average number of articles and average numbers of characters in each article. The results are shown in Table 4 and Table 5. The number of articles published by Nihon Keizai Shimbun is significantly larger than the others, and Nihonkai Shimbun newspaper has highest number of average characters in each article, with the difference also being statistically significant. On the other hand, a significant difference is not observed between Asahi Shimbun, Mainichi Shimbun, and Yomiuri Shimbun.

Table 3 Number of articles and number of characters

	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Total pages per year	36 or 40	28 or 32	36 or 40	40	28
Number of articles per year	518	533	540	912	520
Articles per edition	1.42	1.46	1.48	2.5	1.42
Page one articles per edition	0.037	0.049	0.039	0.063	0.051
Number of characters per year	347,549	329,744	353,165	526,584	402,927
Characters per edition	952	903	968	1443	1104
Characters per article	671	619	654	577	775

Table 4 Analysis of variance of average number of articles

Newspaper	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Articles per edition	1.419	1.460	1.479	2.499	1.425
Difference					
Asahi	-				
Mainichi	-0.041	-			
Yomiuri	-0.060	-0.019	-		
Nihon Keizai	-1.079**	-1.038**	-1.019**	-	
Nihonkai	-0.005	0.036	0.055	1.074	-

\*\* : 1% Significant

Table 5 Analysis of variance of average number of characters

Newspaper	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Charcters per article	670.94	615.70	654.01	577.39	774.86
Difference					
Asahi	-				
Mainichi	55.24	-			
Yomiuri	16.93	-38.31	-		
Nihon Keizai	93.55*	38.31	76.61*	-	
Nihonkai	-103.92*	-159.16**	-120.85**	-197.46**	-

\*\* : 1% Significant \* : 5% Significant

### 3.2 Number of Articles for Different Months and Days

Next, the change in the number of articles each month is compared. Figure 1 shows the results of summing the number of articles for each newspaper during each month. The four national newspapers exhibited some changes over time. The number of articles increases in months that featured a prominent news story, for example, when a gasoline tax program was announced in December and former Prime Minister Abe took office in September. On the other hand, a decrease occurred in the month without a major news story. The local paper, Nihonkai Shimbun, differed from the national papers in that no increase or decrease occurred corresponding to the occurrence of major news stories.

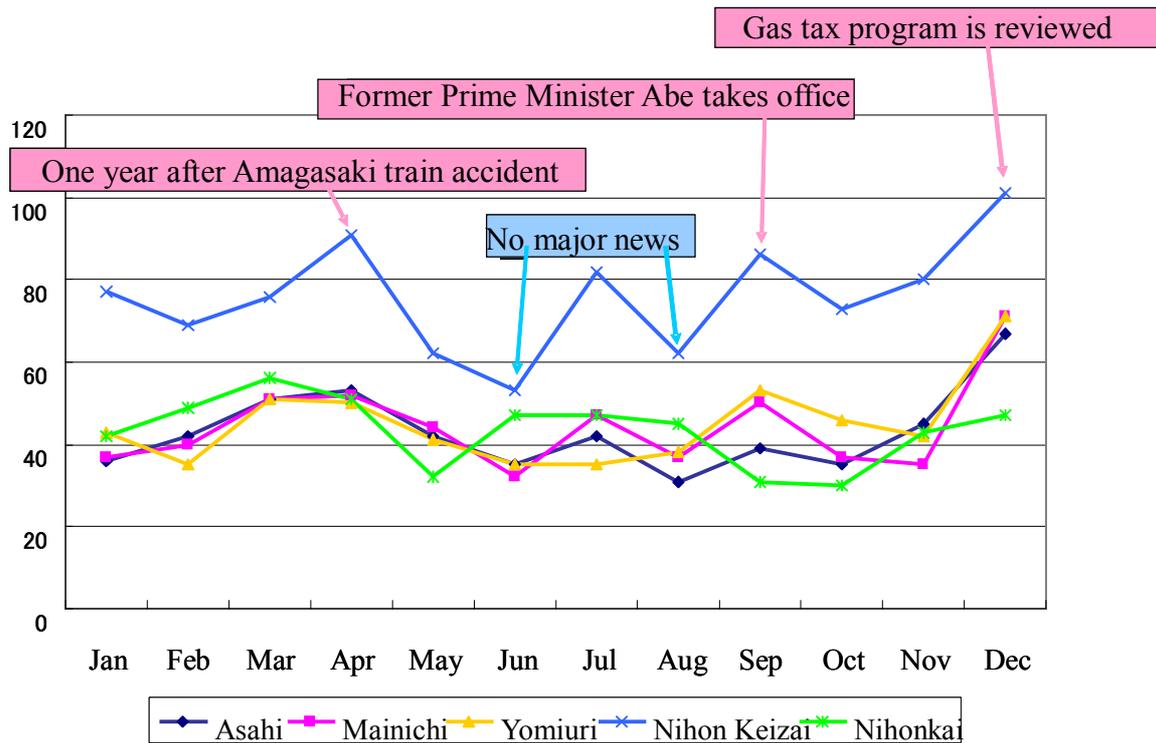


Figure 1 Monthly changes in number of articles

It is also possible to compare the day-to-day changes in the number of articles. Figure 2 shows the changes in the number of articles from Dec 1 to 10, when the gas tax program was announced. Figure 3 shows the changes from June 1 to 10. The national newspaper published about three articles per day when the gas tax program was announced in December. Moreover, 9 articles were published in Nihon Keizai Shimbun on December 8, which was the largest number of transportation articles to appear in a newspaper on a single day during the time period of this study. Few articles relating to transportation were published when there was no prominent news story, such as in June. On the other hand, a large difference was not observed during either time period for Nihonkai Shimbun. Table 6 is the correlation matrix between newspapers for the number of news articles per day. The correlation coefficients of Nihonkai Shimbun are smaller than those of the national papers by 0.1-0.2 point. Thus, there is little correlation with the national newspapers. Therefore, the reporting styles of the regional newspaper, Nihonkai Shimbun, and the national newspapers are notably different.

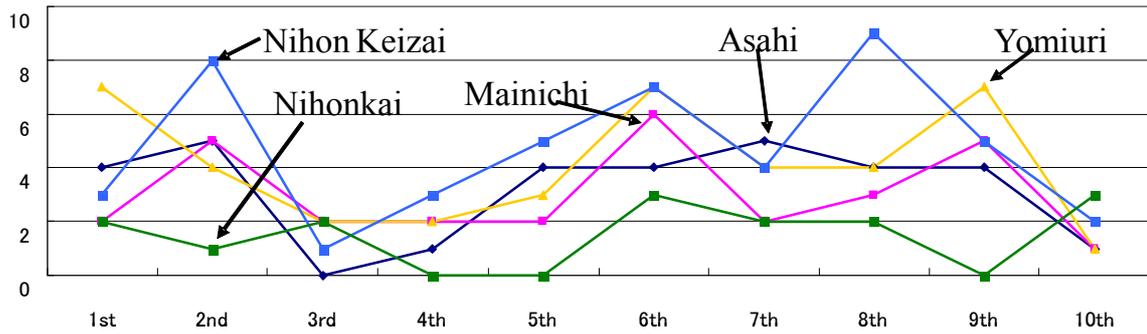


Figure 2 Changes in number of articles from Dec 1 to 10

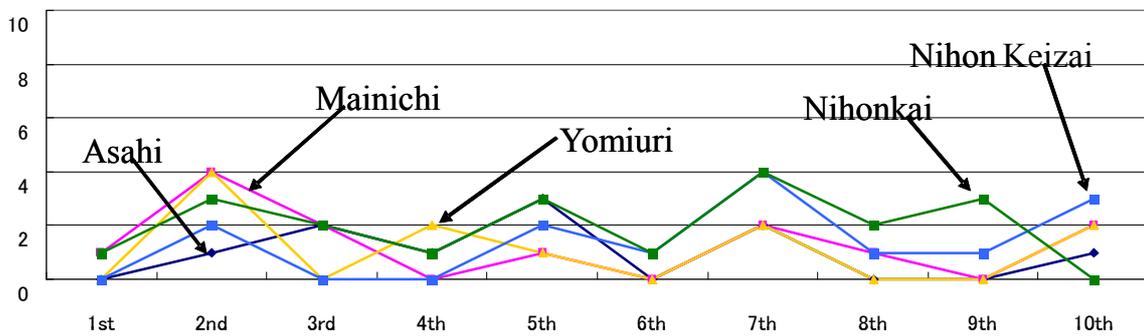


Figure 3 Changes in the number of articles from Jun 1 to 10

Table 6 Coefficient of correlation for number of articles

	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Asahi	1.000				
Mainichi	0.365	1.000			
Yomiuri	0.350	0.401	1.000		
Nihon Keizai	0.351	0.442	0.388	1.000	
Nihonkai	0.112	0.220	0.180	0.238	1.000

News reports that temporarily focus on transportation issues, such as those published by the national newspapers, might increase citizens' awareness. However, this effect is expected to weaken immediately since the news reports are not continued for a long time. Thus, a decrease in "awareness and understanding" occurs. Moreover, most newsmen belong to the press club of administrative organizations, and many articles seem to rely on the material contained in press releases from these organizations. It is time to reconsider whether news reports convey information important to the citizens, and whether reporting stories should continue over longer times to ensure the understanding of citizens.

#### 4. AMOUNT OF NEWS IN LOCAL PAPERS

Over the course of this study, it became clear that the regional newspaper and the national newspapers have different reporting styles. Thus, we focus on the local pages of the newspapers, which cover local events and issues.

Table 7 Transportation reports on local pages

	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Total pages (local pages)	~2	~2	~2	~2	~6
Number of articles	49	87	58	220	520
Rate of regional pages	9.5	16.3	10.7	24.1	77.5
Average characters per article (All pages) =A	671	619	654	577	775
Average characters per article (Local pages) =L	490	569	461	527	775
L / A	73.0%	91.9%	70.5%	91.3%	100.0%

Table 7 lists data on transportation reports on the local pages of the newspapers examined in this study. Since Nihonkai Shimbun is a regional newspaper, it is natural that there are many local pages. Moreover, the number of articles on local pages is also more than that of the national newspaper. Nihon Keizai Shimbun has 220 articles on local pages in a year. This is considerably more than the other national newspapers, which each had less than 100 articles. An analysis of variance finds significant differences in the mean values of the number of transportation articles and the number of average characters between each newspaper. The results are shown in the Table 8. The difference between the other national newspapers and Nihon Keizai Shimbun is statistically significant. However, a difference between Asahi Shimbun, Mainichi Shimbun, and Yomiuri Shimbun is not significant. Nihon Keizai Shimbun had relatively few articles, and many articles on regional business were reported. On the other hand, the three national papers (Asahi Shimbun, Mainichi Shimbun, and Yomiuri Shimbun) reported a large amount of national news. Next, we consider the difference in the number of characters per article for transportation articles on local pages. The articles on local pages are generally shorter compared with the average article size of the newspapers as a whole, even though the number of published pages are limited in all the newspapers. The ratio of local article length to overall article length for Mainichi Shimbun is largest among national newspapers with a value of 91.9%, and the ratio for Yomiuri Shimbun is the smallest with a value of 70.5%. Thus, many newspapers do not consider regional transportations to be important.

Table 8 Analysis of variance of average number of transportation articles (local pages)

Newspaper	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai
Local articles	0.134	0.238	0.159	0.603	1.104
Difference					
Asahi	-				
Mainichi	-0.104	-			
Yomiuri	-0.025	0.079	-		
Nihon Keizai	-0.468**	-0.364**	-0.444**	-	
Nihonkai	-0.970**	-0.866**	-0.945**	-0.501**	-

\*\*: 1% significant

## 5. CLASSIFICATION OF NEWS CONTENTS

### 5.1 Classification by Transportation Mode

The articles are classified into four categories based on mode of transportation, namely, road, railway, airlines, and maritime transportation, by using the keywords shown in Table 9. The purpose of this analysis is to understand the current share of the transportation news for each mode of transportation. As a result, it was found that the national newspapers did not differ greatly in terms of the amount of content devoted to each transportation mode. Basically, the national newspapers each devoted about 30% of their transportation coverage to each of three modes: roads, railway, and maritime transport. On the other hand, airlines articles appeared in Nihonkai Shimbun about 20% less frequently than in the national newspapers, and articles relating to roads were about 40% more common. Moreover, the articles on roads and railways were relatively more abundant on local pages. There was little change in this regard for Nihonkai Shimbun since the majority of its transportation articles were published on local pages.

Table 9 Classification keywords for modes of transportation

Transportation	Keyword
Road	road, bus, taxi, car, truck, capital freeway, backup
Railway	Japan Railways, station, Shinkansen, train, electric railway, special express, subway
Airlines	airlines, airport, glide slope, charter, All Nippon Airways, jet
Maritime transport	marine, harbors, new port, ferry, passenger boat, shipping service, container ship, high-speed ship, excursion ship

## **5.2 Classification of Article Content**

In addition, the articles were classified into 11 categories such as “tax”, “safety”, and “policy and planning”, as shown in Figure 4. These classifications were made according to original keywords, and the classification subjects overlap here. Figure 4 shows the proportion of transportation articles classified into these 11 categories. Many articles on "policy and planning" and "construction and maintenance" were published. Moreover, Nihonkai Shimbun contained many articles on sightseeing and users of transportation. The importance of regional concerns can be clearly seen since Nihonkai Shimbun seems to promote Tottori Prefecture.

## **5.3 Analysis of Tone of Articles**

Next, we examine coverage for the opening of new roads in transportation articles. These articles are classified as one of the following four tones: positive, negative, mixed reception, and strictly factual. Figure 5 shows the proportion of articles with each tone. A majority of articles published in all the newspapers examined in this study are strictly factual. However, many of the other articles in the national newspapers are negative. On the other hand, Nihonkai Shimbun has more positive articles than negative articles. In articles that are strictly factual, the reader is not exposed to opinions relating to transportation, and as a result, a decrease in concern may occur. Moreover, largely negative articles will bias readers' opinions. Therefore, it is important to provide readers with both viewpoints by strongly expressing both positive and negative opinions. This will encourage continuing coverage of transportation projects, raise awareness, and advance the interests of both businesses and citizens.

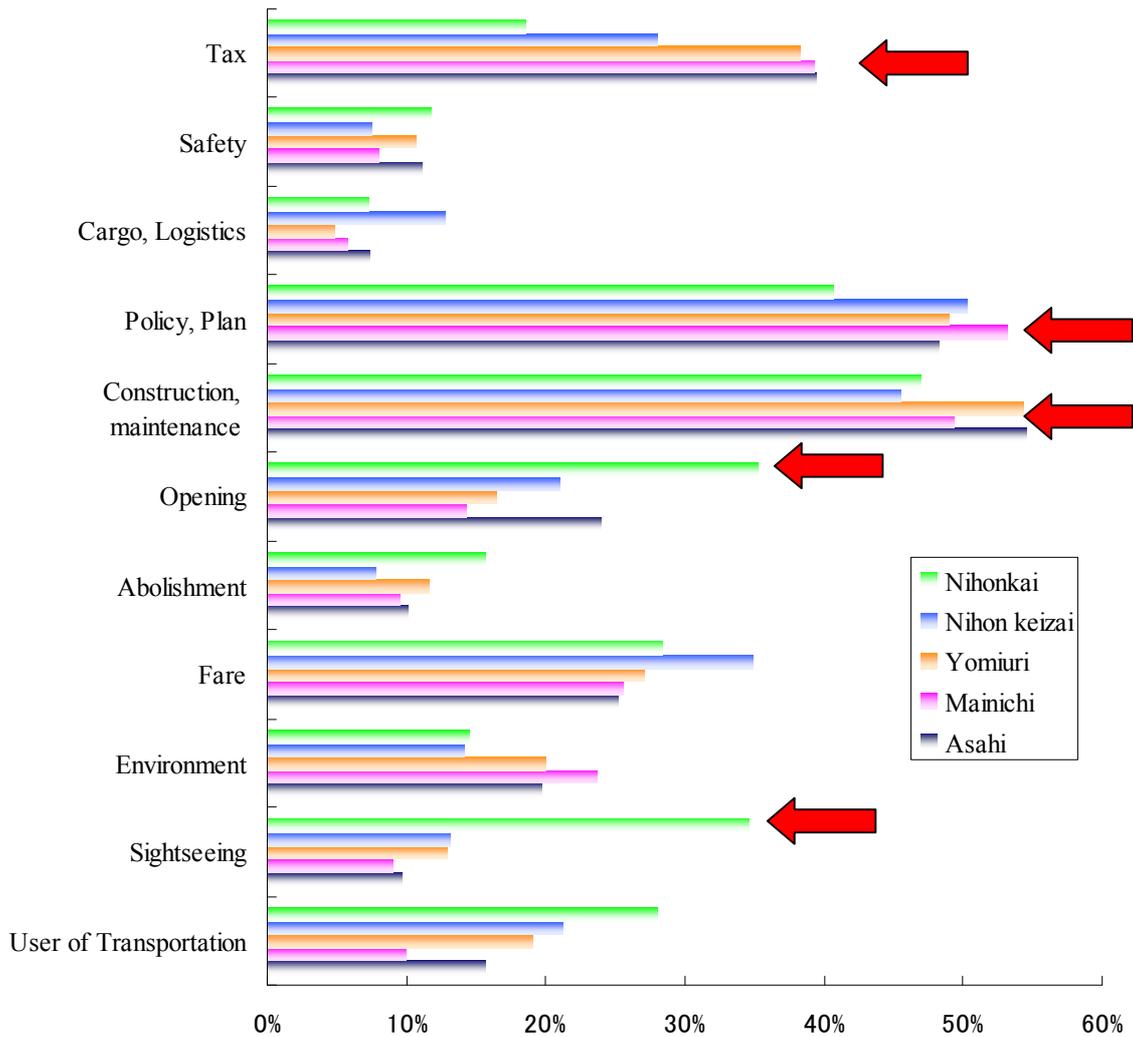


Figure 4 Classification of article content

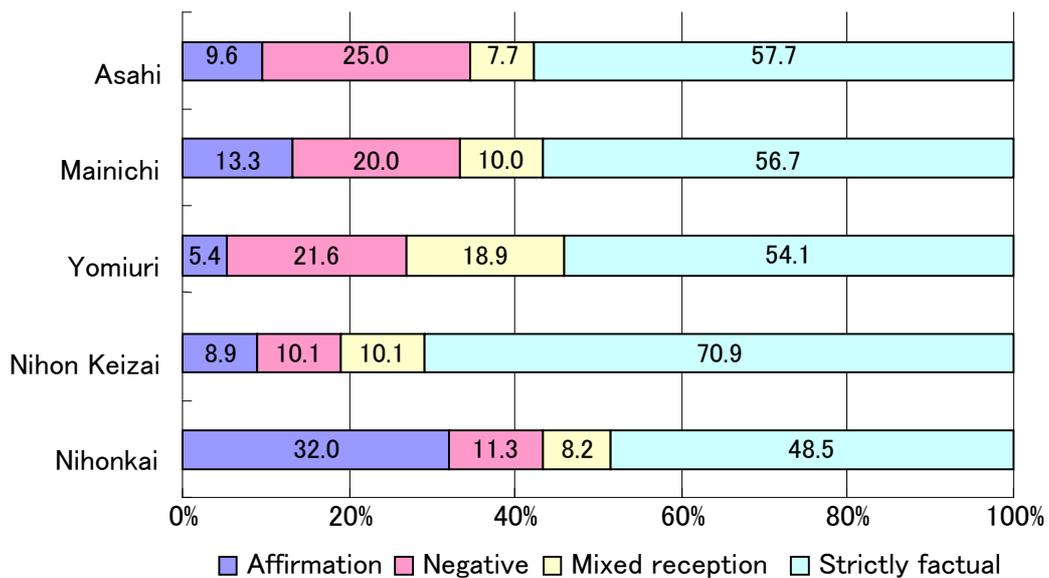


Figure 5 Ratios of tone of article commentary

## 6. COMPARISON WITH AMERICAN NEWSPAPER

Press reports from the United States are analyzed to evaluate the current state of transportation reporting in another country in comparison with Japan. In this study, USA Today (Japanese delivery version) was the only national American newspaper examined. The method of analysis extracts 50 articles at random from among the 125 articles published from November 9, 2007 to May 5, 2008, and each article was read individually after extraction. This is the necessary number of extracted articles based on preliminary research, assuming a standard deviation of 1.16, a permissible error margin of 0.3, and a significance level of 0.05. Following extraction of the articles from USA Today, the amount of transportation news for the year is compared, the results of which are shown in Table 10. In this research, the number of pages of USA Today is low since we used the Japanese delivery version, and the weekend edition is published only 255 times per year. Therefore, the total number articles of USA Today is the lowest; however, in terms of the average number of articles per page, USA Today contains twice as many articles compared with newspaper in Japan, (016 articles and 0.05 articles, respectively). In the future, it will be important to expand the number of articles that more closely relate to the lives of citizens, such as articles related to transportation in the United States so that the citizens may deepen their understanding of business in Japan.

Next, we classified the articles according to mode of transportation, namely, road, railway, airlines, and maritime transport, by reading the extracted articles one by one. Figure 6 shows the proportions of each mode of transportation for all the newspapers. In domestic national newspapers, the content related to roads, railway, and airlines is roughly equal. On the other hand, in USA Today, railway articles are scarce, and airlines articles constitute the majority of transportation articles (68.4%). It is thought that since America is larger than Japan, both economically and geographically, there are more chances for Americans to use aircraft. Moreover, the feature of handling a lot of articles related to space was seen though it did not contain as an article.

Table 10 Yearly number of report including USA Today

	Asahi	Mainichi	Yomiuri	Nihon Keizai	Nihonkai	USA Today
Total pages	36or40	28or32	36or40	40	28	16
Number of articles	518	533	540	912	520	515
Articles per edition	1.42	1.46	1.48	2.5	1.42	2.02
Page one articles per edition	0.037	0.049	0.039	0.063	0.051	0.126

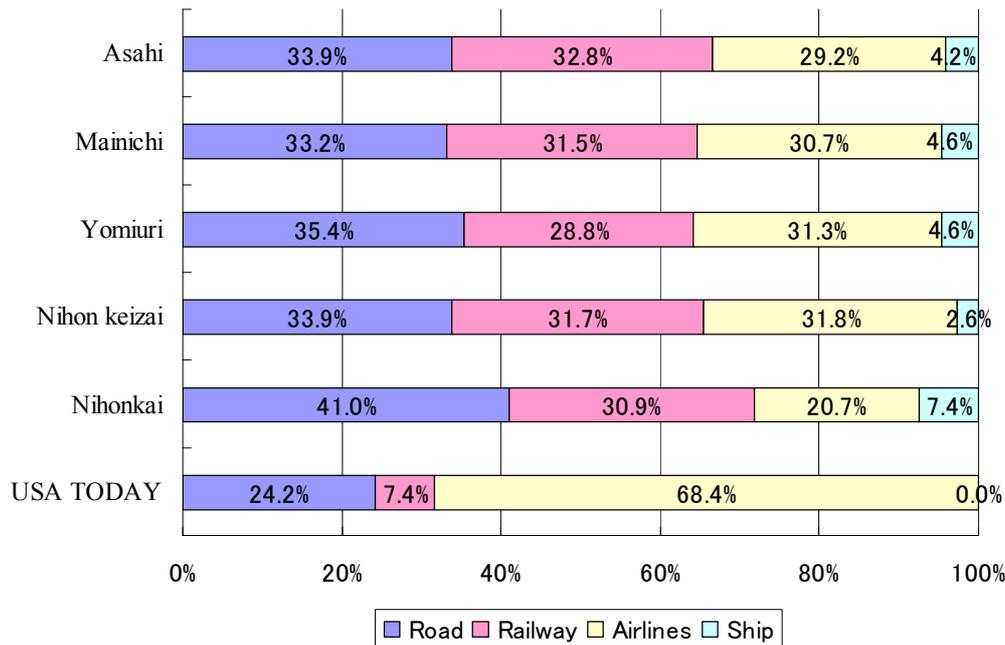


Figure 6 Ratios of articles about various modes of transportation

## 7. CONCLUSION

News articles related to transportation in national newspapers, a regional newspaper, and an American newspaper were extracted and compared in terms of the number of articles. The current state of a transportation reporting was able to be understood through this research. The difference between the national newspaper regional newspapers in the report has been also understood. The significant outcome of this research can be found to make a huge article database and to show the difference quantitatively.

The following were the main findings: (a) national newspapers in Japan published fewer transportation articles than the American newspaper, (b) for transportation articles, the frequency of publication was highly variable, and a lot of articles relating to transportation were announced at the prominent news story, but only a little article was announced when there was no prominent news story, (c) the articles that appeared in the local newspaper were few, and the three national papers (Asahi Shimbun, Mainichi Shimbun, and Yomiuri Shimbun) were below the half of Nihon Keizai Shimbun, (d) a majority of articles published in all the newspapers examined are strictly factual. However, many of the other articles in the national newspapers are negative, on the other hand, Nihonkai Shimbun has more positive articles than negative articles. Therefore, awareness and understanding of the transportation projects could decrease and it was misidentified. In the future, considering the needs of citizens to a greater extent in reporting transportation news will better serve the public good.

Based on the results of study, we propose the following recommendations for newspapers: (a) the number of reports regarding the effects of transportation on the lives of citizens should be

increased, (b) special articles and continued reporting should be utilized in order to heighten the concern of readers, (c) regional considerations should be incorporated into reporting in order to improve the quality of life for the region, and (d) both positive and negative articles should present information accurately. The recommendation for government is that, it is preferable not only to focus on topics such as road cleaning and planting management but also to engage in collaborative efforts with citizens. It is thought that these insurances can confirm validity by interviewing parties concerned involved in the newspaper, mass communication media, and journalism.

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