

Research Article

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Net promoter score, growth, and profitability of transportation companies

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Abstract: Introduced in 2003, net promoter score (NPS) very quickly gained popularity, as a customer loyalty measure, among companies and a part of researchers, due to its simplicity, the ease of interpretation, low costs of calculation, and, overall, its assumed impact on future growth and profitability. In due course of literature review, it was identified that not all researchers endorsed NPS, rejecting its presumed impact on growth and its superiority over other loyalty measures. This study aims therefore to verify the influence of NPS on the growth and profitability of Polish transportation companies. This objective is achieved with the use of Spearman correlation ranks and linear regression. The findings of this study reject the proclaimed relationship between NPS and growth; hence, in that matter, the results are aligned to criticism presented in literature. The study, however, confirmed a positive and statistically significant relationship between NPS and profitability. Accordingly, the study recommends Polish transportation companies to include NPS in a portfolio of metrics, however, not as a stand-alone diagnostic tool.

Keywords: net promoter score (NPS), customer loyalty, customer satisfaction, performance measurement, transportation

JEL codes: M30, M31, R49

1 Introduction

Strategies of many contemporary companies are almost entirely focused on consumers. These companies, with the use of, inter alia, surveys or focus groups, constantly put their consumers under a microscope, aiming to understand their behavior. This is, however, not a straightforward task. Typically, companies tend to look at satisfaction measures, market shares, or sales figures. According to research undertaken by Bain Company, there exists a certain body of consumers, who, despite providing scores indicating “satisfied” in surveys, soon move to competitors. Analysis of the information stemming from market share, although realistic, can temporarily mask significant trends due to heavy spending on promotions or advertisements. Additionally, both market shares and customer satisfaction surveys, according to Blasberg et al. [2008], look backward – not forward; accordingly, these metrics provide little or no information on future consumer behavior. The authors [2008, p. 16] further recommend the companies to look for more advanced tools for examination of consumers’ contentment, in particular, in the loyalty area. According to Anderson et al. [2014], due to the commercial omnipresence of Internet customers, loyalty is harder than ever to achieve. Although customers’ loyalty has been a subject of many studies, there is no consensus on the perfect loyalty measure. One of the recent and modern customer loyalty measures is the net promoter score (NPS). This score is significantly reliant on promoters (i.e., people willing to recommend a product or a company to a friend or a colleague) and detractors, being the opposite [Reichheld, 2003]. Opinions, i.e., word of mouth, of clients are widely acknowledged in the literature as a mean of the client’s influence (positive or negative) on organizations [Lotko, 2012]. The value of word of mouth is generally considered in the literature to be

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significant, because it costs the retailer nothing, it can be immediately communicated through modern channels, such as the Internet or mobile phones, and it has an immediate sense of credibility [Grewal et al., 2003]. Moreover, it should be noted that pursuant to considerable online dialogue during social media development, word-of-mouth marketing has become increasingly important [Deszczyński, 2017].

Considering the significance, complexity, and difficulties of loyalty measurement, followed by the recent [Reichheld, 2003] proposal of the NPS index as an efficient tool for loyalty measurement and management, the objective of this paper is to verify whether the stated index has an impact on a company's growth and profitability. The relevance of the subject of the study is further supported by the high popularity of NPS among companies and the split opinions presented in the literature, i.e., some researchers endorse the NPS, whereas others have criticized it. In this research, the impact of NPS on the growth and profitability of Polish transportation companies has been studied.

The paper is organized as follows. In the first section, the characteristics of customer loyalty are provided. In the second section, the NPS index is described and discussed. In the third section, the criticism of the considered index, based on literature review, is presented. Based on the work done in the aforementioned sections, hypotheses are developed. In the following research section, key figures concerning the selected study transportation companies are provided. The research follows with descriptive statistics of the studied variables. In the next step, normality tests are performed, based on which, the relevant correlation tests of significance are conducted to verify the hypotheses developed. The hypotheses are also verified with the use of linear regression. Finally, the conclusions of the study, practical implications, and directions for further research are presented.

2 Customer loyalty

Customer loyalty has been the subject of many studies in the past decades, e.g., Tucker [1964], Jacoby and Chestnut [1978], Pearson [1996], Griffin [1997], Oliver [1999], Dziewanowska [2007], and Rahim [2016]. According to Pearson [1996], customer loyalty is defined as the customer's mind-set concerning the company, its products, or services, which provides a favorable attitude toward an organization, a commitment to repurchase the company's products, and a tendency to recommend the product or a company to other clients.

Loyalty is closely related to satisfaction, however, as it requires an action; it is, therefore, a larger term than satisfaction. According to Jones and Sasser [1995], loyalty increases together with satisfaction. The relationship between these variables is neither simple nor linear, and it depends on the industry. The higher the competition, the more important is the customer satisfaction. Authors claim that since customers are reasonable, if they are not completely satisfied and if they have a choice, they can be lured away easily. It is essential, therefore, to keep clients completely satisfied. Completely satisfied customers are, in turn, much more loyal than satisfied customers. They are, therefore, a key in generating sound long-term financial performance. The authors divide loyalty into true long-term loyalty and false loyalty. The latter results from several factors that make customers seem loyal, when indeed, they are not. These factors include high switching costs, strong loyalty-promotion programs, government regulations that limit competition, and others.

Reichheld [2003] defines loyalty as the willingness of someone to make an investment or personal sacrifice in order to strengthen a relationship. In the case of a customer, it can mean, e.g., sticking with a supplier even when a supplier does not offer the best price in a particular transaction, hoping for a good and fair value in the long term. Reichheld [2003] also notes that loyalty is not about repeating purchases, however. Someone might repeat purchases because of high exit barriers, indifference, or lack of alternatives. Conversely, a loyal client may not repeat purchases frequently because of the reduced need for a product. An important characteristic of a loyal customer, however, is that such a person talks up a company or a product to friends and family, thus promoting it.

The loyalty of clients tends to be very important through recessions. As indicated by Anderson et al. [2014], the strategy to invest in customer loyalty, as opposed to cost-cutting strategies, during significant

economic downturns, although counterintuitive, was found to be superior in terms of the companies' survival, while simultaneously gaining a long-term competitive advantage.

A significant portion of research has indicated the dependence of NPS or customer loyalty on the company's growth or profitability [Anderson et al., 1994; Wansink, 2003; Blasberg et al., 2008]. Reichheld et al. [2000] state that a small increase in customer loyalty contributes to a high growth of profits.

3 Characteristics of NPS

The NPS was introduced by Frederick F. Reichheld in a 2003 article in the *Harvard Business Review*. The author initially criticized the use of customer retention rates, which despite substantial usage in business, were a poor indicator of customer loyalty and growth. Other conventional customer satisfaction measures, including the American Consumer Satisfaction Index (ACSI), were also not reliable, mainly because of their complexity, difficulties in interpretation, high preparation costs, and no overall significant connection with the growth of sales.

Reichheld [2003] noticed that the key to measuring customer loyalty was to give priority to the most satisfied clients. Delighted customers promote the company's products to their friends, becoming – in effect – an unpaid marketing department of the company. Reichheld [2003] also noted that it is not only enthusiasts who count: the level of frustration and disappointment among customers of the company is also of utmost importance, as the company is likely to lose these clients, unless corrective actions are taken. The critical question in loyalty measurement is neither about satisfaction nor about loyalty, but about the willingness to recommend a product or service to a friend, colleague, family, or just someone else.

The NPS is calculated based on the survey responses of a likelihood-to-recommend question on a 0–10 scale. This question is “How likely is it that you would recommend ‘a company’ to a friend or colleague?” The rank of ten means the customer is very likely to recommend a company to someone, while zero means that the client is unlikely to recommend a company to someone, and five is neutral. Typically, this question is followed by several auxiliary open-ended questions, in which the companies ask consumers to describe the reasons for their score. In order to calculate the NPS, the proportion of respondents who rated the company ≤ 6.0 (Detractors) is subtracted from the proportion of respondents who rated the company 9.0 or 10.0 (Promoters). The difference represents a company's NPS. Respondents who rated the company 7.0 and 8.0 are called passively satisfied. The division of customers into these three stated clusters was a result of the examination of referral and repurchase behaviors [Reichheld, 2003; Blasberg et al., 2008].

According to Blasberg et al. [2008], measuring a brand's NPS and subsequent comparison of the results with the NPS of competitive brands gives some insight on both the rational and the emotional sides of consumer behavior. This is because NPS is supposed to indicate future consumer behavior [2008].

Pursuant to an issue of the *Harvard Business Review* containing articles on NPS, many articles appeared confirming its significance and benefits in practical application [Korneta, 2014; McGregor, 2006; Reichheld, 2006a, 2006b; Lotko, 2015]. The possibilities for the practical application of NPS in business environments were confirmed by the use of that score in the following, inter alia, prominent companies: Allianz, American Express, Procter & Gamble, and Amazon [Gajewska and Szewczyk, 2012, s. 413; Pomaskow, 2014].

Nonetheless, despite the considerable benefits attached to the NPS, shortly after that score had been introduced, criticism from other researchers has begun to appear [Kristensen and Westlund, 2004]. Grisaffe [2007] stated that because the NPS is calculated based on only two out of the three categories of customers (promoters and detractors), a significant portion of information is being lost. The author also raised considerable doubts regarding the cutoff points in the recategorization of the initial 0–10 scale. For instance, a response of 6.0, despite being above the midpoint of the scale, was placed among the detractors and, therefore, interpreted as negative. Grisaffe further questioned the sensitivity of choice of all the cutoff points. Finally, the author criticized the low precision of NPS, claiming that better, i.e., more precise, predictive power would be obtained with the application of the original 0–10 scale. The issue of NPS precision was also touched on by Seal and Moody [2008].

A significant portion of the criticism referred to the simplicity of the measure, stating that NPS is overly simplified and therefore cannot measure complicated sets of relationships [Brandt, 2007; Pingitore et al., 2007].

Keiningham et al. [2008] claimed that NPS is not a reliable indicator of growth and that it cannot be considered superior to other loyalty measures. Similar claims were also raised by Morgan and Rego [2008] and Kristensen and Eskildsen [2014].

Pollack and Alexandrov [2013], following a study based on 159 surveys, research, and an analysis of a set of pros and cons, recommended to include the NPS in a portfolio of customer metrics, however, not as a stand-alone diagnostic tool, as proclaimed by Reichheld [2003].

4 Hypotheses

Given the considerable benefits of NPS presented in the literature, its simplified and low-cost approach toward description and interpretation of complex customer loyalty matters, set against significant criticism received from some researchers, the objective of the study is to verify whether NPS is, in fact, an effective loyalty measure. The study has been undertaken in the Polish transportation industry. The limitation in terms of studying only one country and one industry is introduced deliberately. This is primarily because the findings presented so far in the literature, from different countries and different industries, are often contradictory, i.e., some support NPS, while the others criticize it. The papers supporting NPS or loyalty often link high loyalty or NPS with growth or profitability [Jones and Sasser, 1995; Reichheld, 2003; Blasberg et al., 2008]. The paper aims therefore to verify whether there is a relationship between NPS, growth, and profitability of Polish transportation companies. In order to achieve this objective, it was hypothesized as follows:

H1: NPS contributes positively to a growth of the Polish transportation companies.

H2: There is a positive and significant relationship between NPS and profitability of Polish transportation companies.

5 Research design

The sample for this study comprises figures relating to 34 Polish transportation companies in three consecutive periods 2014–2016. The data used in the study were obtained from the following two data sources:

“Operator logistyczny roku” reports on logistic operators for the years 2014–2016 issued by EuroLogistics [2015, 2016]. The aforementioned reports were prepared based on surveys with clients of logistic companies participating in these reports. Eurologistics sent questionnaires directly to the clients of participating logistic operators, received answers, compiled information, and published reports in all the stated consecutive years. The objective of these reports was to measure logistic quality, satisfaction, and loyalty from the client’s perspective and to compare and rank logistic companies. Among the several ratios provided in these reports, NPS – contemplated in this study – appeared. Although the reports had been published for a significantly earlier period than from 2014, the period of study commences in the year 2014, because NPS has been measured and published for the first time in that year.

The Emerging Markets Information Service (EMIS) database, from where financial statements of all the 34 studied companies for the four consecutive financial years between 2013 and 2016 were obtained. The periods of studied financial statements commenced 1 year prior to the logistic reports, i.e., in 2013 instead of in 2014, as the computations of the three variables related to growth required the use of the previous year’s (2013) figures.

Because either not all the companies participated in the logistic reports in each of the considered years or the EMIS database did not contain the financial statements of the analyzed companies in each of the three

studied periods, only 76 observations, instead of 102, were subject to analysis. Accordingly, as shown in Appendixes 1 and 2, the observations of 18 companies appeared in all three periods, the observations of six companies occurred only twice in all figures and so were used only twice, whereas the observations from the remaining 10 companies were used only once. It should be noted that no company, nor any observation, was intentionally removed from the studied sample, i.e., the data set is unbiased, while the removal of the most atypical observation would enhance the result of the tests undertaken in the study.

Growth is primarily considered in the literature as the growth of sales [Glancey, 1998]. In this study, however, the growth is also measured as the growth of earnings before interests, tax, depreciation, and amortization (EBITDA) and the growth of net results.

In the case of H2 verification, return on assets (ROA), return on equity (ROE), and return on sales profitability (ROS) are selected as the profitability measures. Each of the stated ratios is of particular interest to various stakeholders and is frequently used in studies in literature [Dawkins et al., 2007; Lyngstadaas and Berg 2016; Nauriyal, 2017]. ROE, however, is considered as the closest ratio to the shareholder value and, in that respect, it is considered superior to other profitability measures [Wright, 1975]. All the three above-described ratios are calculated using both the net result and the EBITDA; again, this is a common practice already seen in the literature [Dawkins et al., 2007]. The variables used in the study are described in Table 1.

Table 1. Variables used in the study

Variable	Acronym	Description
Net promoter score NPS		The difference in the proportions of respondents ranked as promoters and detractors. The variable ranges between –100 and 100.
Growth of sales	GRS	The difference in sales between this year and previous year divided by the previous year's sales
Growth of EBITDA	GRE	The difference between this year's earnings before interests, tax, depreciation, and amortization (EBITDA) and previous year's EBITDA divided by previous year's EBITDA
Growth of net result	GRNR	The difference between the net result and previous year's net result divided by previous year's net result
Return on assets	ROA	Ratio of the net result to the total of assets
Return on assets 2	ROAE	Ratio of the EBITDA to the total of assets
Return on sales	ROS	Ratio of the net result to the total of sales
Return on sales 2	ROSE	Ratio of the EBITDA to the total of sales
Return on equity	ROE	Ratio of net result to equity
Return on equity 2	ROEE	Ratio of EBITDA to equity

As indicated above, the studied sample consisted of 34 companies. The studied sample comprised the most prominent logistic companies, e.g., three DHL companies, DPD or FM Logistic; principal national mail operator Poczta Polska, as well as several minor companies. As a consequence, the mean sales revenue of the studied companies varied highly from several million PLN to > 5 billion PLN. More details on the mean values of the selected variables of the studied companies are shown in Appendixes 1 and 2.

Table 2 contains the descriptive statistics of the variables used in the study. Mean of 54.4, standard deviation (SD) of 24.8, minimum of –0.20 (negative), and a maximum of 100 of NPS suggest great differences among the companies within the studied period. Negative minimum values of variables, resulting from negative results in terms of both net result and EBITDA, or a higher proportion of detractors than promoters in the case of NPS appeared within the studied sample of observations. Mean growth of sales revenues of 0.18 can be considered high; however, a median of 0.09 points out that half of the companies grew slower than 0.09 per year. The highest mean profitability of shareholders' funds (ROEE) measured with EBITDA amounted to 0.73, while when measured with net result, it totaled 0.3, confirming that the industry is, in general, highly profitable. A wide range of variations among the profitability variables is apparent in Table 2, as represented by their minimum and maximum values.

Table 2. Descriptive statistics of selected variables in the period between 2014 and 2016

Variables	Mean	SD	Median	Min	Max	Skewness	Kurtosis
NPS	54.3855	24.8462	58.3000	-20.0000	100.000	-0.7746	0.4991
GRS	0.1823	0.5009	0.0943	-0.1098	4.246	7.1909	55.5921
GRE	0.4613	3.2578	0.1508	-16.0941	19.4218	1.1577	22.2057
GRNR	-0.1262	16.4389	0.0364	-101.858	98.4515	-0.2878	34.2880
ROA	0.1006	0.1215	0.0621	-0.0973	0.5335	1.6242	3.0076
ROAE	0.1544	0.1158	0.1369	-0.0413	0.5673	1.3022	2.3971
ROS	0.07173	0.2024	0.0263	-0.0260	1.3573	5.4915	30.1281
ROSE	0.0756	0.0632	0.0598	-0.0109	0.2591	1.2583	1.0294
ROE	0.2987	0.5099	0.3232	-2.9689	1.4221	-3.2564	20.5446
ROEE	0.7281	0.8062	0.5496	-0.6704	3.4954	1.7762	3.3465

Source: Author's compilation based on 76 observations, from the EMIS database, 2018.

Since a normality assumption is a key assumption in the majority of statistical tests of significance in the very beginning of an empirical study, all variables were subject to verification that they follow a normal distribution pattern. This is mainly because almost all the statistical tests are developed by keeping a normal distribution in mind. And so, e.g., the frequently used Pearson correlation coefficient requires that a set of data upon which a statistical test of significance is being undertaken must either exactly, or at least approximately, follow a normal distribution. Since not all the normality tests are equal nor are suitable for all the situations [Siddiqi, 2014, pp. 290–291]; in Table 3, the results of four different normality tests are provided. All the four statistical test have the same null hypothesis, i.e., the data are normally distributed.

Table 3. Tests of normal distribution

Test/variable	Doornik-Hansen	Shapiro-Wilk	Lilliefors	Jarque-Bera
NPS	8.87298	0.943362	0.140474	8.38871
<i>p</i>	0.0118374	0.00202184	0	0.0150805
GRS	1827.37	0.333067	0.281243	10441.5
<i>p</i>	0	7.14E-17	0	0
GRE	241.86	0.480801	0.317229	1578.43
<i>p</i>	3.03E-53	6.03E-15	0	0
GRNR	454.902	0.255406	0.399927	3723.99
<i>p</i>	1.66E-99	9.23E-18	0	0
ROA	43.5001	0.855083	0.156707	62.0592
<i>p</i>	3.58E-10	4.17E-07	0	3.34E-14
ROAE	20.6735	0.909117	0.105374	39.6753
<i>p</i>	3.24E-05	4.66E-05	0.04	2.42E-09
ROS	1414.12	0.327221	0.338316	3256.38
<i>p</i>	8.46E-308	6.08E-17	0	0.0E+00
ROSE	38.6542	0.873817	0.157428	23.4112
<i>p</i>	4.04E-09	1.87E-06	0	8.25E-06
ROE	56.592	0.73652	0.14864	1470.91
<i>p</i>	5.14E-13	2.28E-10	0	0
ROEE	60.8214	0.811631	0.21205	75.4237
<i>p</i>	6.21E-14	1.90E-08	0	4.19E-17

Note: *Significance at 0.01.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018.

From the data shown in Table 3, it is apparent that the majority of variables have no normal distributions, assuming a *p*-level of 0.05, i.e., none of the variables have a *p*-value >0.05. Therefore, the null hypothesis

that the data are normally distributed must be rejected. It should be noted, however, that the null hypothesis could be accepted with a p -value of 1% in the case of two variables: NPS and ROAE.

With respect to the results of the normality test presented in Table 3, the decision was made that Spearman's coefficient of rank correlation is the most appropriate choice for further research. This statistics is a nonparametric correlation based on ranked data and not on the actual data. This test is frequently used in the literature for ordinal or interval data and when normality assumption is not being met [Brau et al., 2009, Chan et al. 2009].

Table 4. Analysis of Spearman and Pearson correlation between NPS and selected growth and profit variables

Variable	Pearson correlation coefficient	Spearman correlation coefficient	
GRS	0.16752526	-0.043691115	
GRE	0.155635068	0.150436919	
GRNR	0.088937199	0.025886473	
ROA	0.325424301	* 0.316394781	*
ROAE	0.206332032	0.139961991	
ROS	0.152675197	0.249374388	*
ROSE	0.186006935	0.047260248	
ROE	0.181569744	0.364680642	*
ROEE	0.230083687	* 0.26248856	*

Note: *Significant at a $\alpha < 0.05$; $p > 0.2257$.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018.

Table 4 reports the Spearman and Pearson correlation coefficients; however, as the normal distribution assumption is not met in the studied variables, the most appropriate is the Spearman correlation coefficient; hence, the Pearson correlation coefficients are shown only for indicative and comparison purposes. The results of the estimations confirm the statistically significant and positive relationship between NPS and the three profitability variables ROA, ROS, and ROE – measured with net result – and one profitability variable ROEE – measured with EBITDA. The highest coefficient of 0.3646 referred to ROE, indicating the most significant relationship between NPS and that particular variable.

Next, the developed hypotheses were verified with the application of linear regression methodology. Table 5 provides the results of the regression coefficient calculations. Since none of the NPS coefficients have a p -value < 0.1 , the results are aligned to those obtained through analysis of Spearman correlation ranks, i.e., the relationship between growth of sales, net result, or EBITDA and NPS is econometrically insignificant.

Table 5. Regression analysis of growth and NPS

	GRE		GRNR		GRS	
	NPS	Const.	NPS	Const.	NPS	Const.
Coefficient	0.020407	-0.64851	0.058843	-3,3264	0,003377	-0,00134
Std. error	0.015057	0.899239	0.076608	4,57536	0,002311	0,137994
t -ratio	1.3553	-0.7212	0.7681	-0,727	1,4618	-0,0097
p -value	0.17943	0.47307	0.44487	0,4695	0,14804	0,99227
Mean dependent variable	0.461319		-0.126168		0.182342	
Standard dev. dependent var.	3.257801		16.43895		0.500917	
Sum squared residuals	776.714		20107.61		18.29069	
S.E. of regression	3.239774		16.48407		0.497164	
R^2	0.024222		0.00791		0.028065	
Adjusted R^2	0.011036		-0.005497		0.01493	
$F(1,74)$	1.836943		0.589994		2.136756	
p -value (F)	0.179432		0.444866		0.148039	

Notes: ***, **, * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018.

The results of the regression calculations between the profitability measures and NPS are shown in Table 6. The results of regression analysis endorse the findings obtained through Spearman correlation ranks, i.e., confirmed the positive and econometrically significant relationship between NPS and profitability measures. The results are, however, slightly different in case of selected profitability measures. Regression analysis confirmed the positive relationship between NPS and ROA and between ROAE and ROEE.

Accordingly, in due course of the research part of this study, the positive and statistically significant relationship between profitability variables and NPS was confirmed. Consequently, H2 was accepted. The empirical study has not, however, confirmed the impact of NPS on growth of sales revenues. Therefore, H1, stating there is a positive and statistically significant relationship between NPS and growth, was rejected.

6 Conclusions

Introduced by Reichheld in 2003, the NPS, due to its simplicity, the ease of interpretation of its results, and the assumed impact on future growth and profitability very quickly gained popularity among companies, including the most prominent ones. Although considerable research has endorsed the NPS concept, a significant proportion of researchers have criticized it. Due to the ambiguity of the indications presented in literature and the practical application of NPS by many companies, the objective of the paper was to study the impact of NPS on the growth and profitability of Polish transportation companies. In the due course of study, the Spearman correlation rank and regression analysis were found to be the most appropriate influence measures. Neither regression, nor Spearman correlation rank, confirmed the impact of NPS on the growth of the analyzed companies. This study confirmed, however, that NPS has a statistically significant and positive impact on ROA, ROS, and ROE profitability measures. This was confirmed by both regression analysis and Spearman correlation rank, which cumulatively confirmed H2. Therefore, the findings of the study can be considered material. The above-presented findings are aligned to those presented by Pollack and Alexandrov [2013], who recommended the inclusion of NPS in a portfolio of customer metrics, however, not as a stand-alone diagnostic tool, as proposed by Reichheld [2003].

The study, however, has several limitations, mostly concerning the studied sample. First, and overall, the size of the studied sample was relatively small. Although the findings are statistically significant with respect to the sample size, the number of observations could have been higher, so as to generalize the findings identified. Second, the studied sample comprised only Polish companies; therefore, the findings should not be considered applicable to other countries. Third, the study focused solely on transportation companies; as a consequence, companies from other industries should not rely on these findings. The second and third limitations have been embraced deliberately; given the dichotomy of the indications presented by various researchers, it was more convenient to focus on one country and on one industry, so the findings cannot be questioned in that matter. With respect to the first limitation, the key problem was lack of relevant bigger data. It should be understood, however, that NPS was introduced as recently as 2003. Accordingly, NPS is less mature as compared to other ratios; consequently, less information is available. On the one hand, from a scientific point of view, it would be better to wait with research until a bigger sample of data is being gathered; but, on the other hand, given that NPS is already working in businesses with full speed, proceeding with research comprising smaller samples of observations seems to be justified.

The aforementioned limitations can be, however, seen as an indication for further research since the question regarding the effectiveness of NPS as a loyalty measure in other industries, countries, and – overall – its presumed relationship with growth remains unsettled.

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Table 6. Regression analysis of profitability and NPS

	ROA			ROE			ROEE			ROS			ROSE		
	NPS	Const		NPS	Const		NPS	Const		NPS	Const		NPS	Const	
Coefficient	0.001591	0.014096		0.000962	0.102123		0.003727	0.096028		0.007466	0.322086		0.004102	0.000473	0.049916
Std. error	0.000537	0.032101		0.00053	0.03166		0.002346	0.140126		0.003671	0.219243		0.055881	0.00029	0.017347
t-ratio	2.9606	0.4391		1.814	3.2256		1.5883	0.6853		2.0338	1.4691		0.0734	1.6285	2.8775
p-value	0.00412	0.66187		0.07374	0.00187		0.11648	0.4953		0.04556	0.14605		0.94168	0.10767	0.00524
	***	*		*	***		**			**					***
Mean dependent variable	0.100638			0.154419			0.298698			0.728128			0.071727		
Standard dev. dependent var.	0.121494			0.115793			0.509944			0.806234			0.202355		
Sum squared residuals	0.989825			0.962795			18.86027			46.17018			2.999467		
S.E. of regression	0.115655			0.114065			0.504845			0.789887			0.201329		
R ²	0.105901			0.042573			0.032968			0.052939			0.02331		
Adjusted R ²	0.093819			0.029635			0.0199			0.04014			0.010111		
F(1,74)	8.764882			3.29048			2.52277			4.136425			1.766086		
p-value (F)	0.004124			0.073736			0.116477			0.045555			0.18795		

Notes: ***, **, * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018.

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Appendix 1. Mean values of selected variables used in the study (Part I, companies from 1 to 18)

	Company	N	Sales	EBITDA	NR	TA	E	NPS	GRS	GRE	GRNR	ROA	ROAE	ROS	ROSE	ROE	ROEE
1	Poczta Polska	3	5486.3	170.2	0.7	4410.3	1306	43.2	-0.03	-0.12	-1.69	-0.01	0.12	0.01	0.1	-0.01	0.39
2	DHL Express	3	1545.3	121.2	88.6	519.6	222	64.1	0.09	0.06	0.07	0.52	0.71	0.18	0.24	1.2	1.64
3	Raben	3	1469.8	115.8	76.8	754.9	252.8	67.7	-0.03	-0.02	0.18	0.31	0.46	0.16	0.24	0.98	1.6
4	DPD	3	1073.3	153.4	79.4	1035.7	312	39.9	0.25	0.33	0.31	0.23	0.44	0.22	0.43	0.75	1.46
5	FM	2	880.3	54.9	24.6	350.3	106.7	58.6	0.06	0.3	0.54	0.14	0.32	0.06	0.13	0.45	1.02
6	Jas-Fbg	1	476	19.7	8.1	184.2	59	52	0.04	-0.05	0.03	0.05	0.11	0.02	0.05	0.14	0.34
7	DSV	1	437.3	11.1	6.9	131.7	39.4	64.5	0.16	-0.12	-0.22	0.06	0.09	0.02	0.03	0.18	0.29
8	GLS	3	425.7	99.8	70.9	261.5	173.8	73.2	0.14	0.09	0.09	0.82	1.15	0.51	0.71	1.23	1.73
9	XPO	2	413.4	39.4	0.8	247.8	37.7	3.6	-0.02	-0.13	-0.23	0.01	0.32	0.01	0.19	-0.03	2.05
10	Panalpina	3	385.4	21.7	16.2	86.1	17.8	67.1	0.08	0.68	0.79	0.57	0.76	0.13	0.17	2.71	3.65
11	DHL Global Forwarding	1	383.3	29.9	23.8	122.7	45.6	50	0.06	0.02	-0.01	0.2	0.25	0.07	0.08	0.53	0.66
12	Link	3	318.9	28.3	9.4	136.1	10.3	34.9	0.23	0.22	0.46	0.21	0.62	0.09	0.27	2.64	8.18
13	Omega Pilzno	3	286.9	30.8	9.3	235.6	59.4	50.9	0.07	-0.1	-0.1	0.13	0.42	0.1	0.33	0.89	3.06
14	Hellmann	1	282.9	2.9	1.1	76.2	21.8	85.8	0.11	-0.11	-0.09	0.02	0.04	0.01	0.02	0.05	0.14
15	GEODIS	3	282.5	3.1	1.6	75.4	2.3	81.1	0.2	0.52	-0.08	0.07	0.13	0.02	0.04	2.44	5.61
16	DHL Supply chain	3	239.6	9.7	4.3	94.7	-22.7	28.2	0.24	0.35	-0.42	0.14	0.31	0.06	0.13	-0.62	-1.36
17	Arvato	3	229.8	10.9	0.8	197.1	18.2	61.1	0.3	1.38	-2.63	0.01	0.16	-0.01	0.14	0.05	1.73
18	C.Hartwig	1	214.7	5.2	3.1	65	4.3	74.5	-0.04	-1.59	-1.21	0.05	0.08	0.02	0.03	0.71	1.2

Note: Variables: N, number of observations; Sales, sales revenue in million PLN; EBITDA, earnings before interests, tax, depreciations, and amortization in million PLN; NR, net result in million PLN; TA, total of assets in million PLN; E, sum of equity in million PLN; NPS, net promoter score in absolute figures (-100,100); GRS, growth of sales; GRE, growth of EBITDA; GRNR, growth of net result; ROA, ratio of net result and total of assets; ROAE, ratio of EBITDA and total of assets; ROS, ratio of net result and total of sales; ROSE, ratio of EBITDA and total of sales; ROE, ratio of net result and equity; ROEE, ratio of EBITDA and equity.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018; and "Operator Logistyczny Roku" Eurologistic reports.

Appendix 2. Mean values of selected variables used in a study (Part II, companies from 19 to 34)

Company	N	Sales	EBITDA	NR	TA	E	NPS	GRS	GRE	GRNR	ROA	ROAE	ROS	ROSE	ROE	ROEE
19 Spedimex	3	166.2	3.1	0.3	49.3	10.4	37.1	0.04	0.11	1.04	0.02	0.19	0.01	0.06	0.08	0.89
20 Maszowski	3	162.6	27.7	23.5	149.1	34.8	95.9	1.56	6.39	32.71	0.48	0.57	0.46	0.54	2.03	2.4
21 Delta Trans	1	153.7	15.1	4.1	79.3	36.2	59.1	0.01	-0.03	0.27	0.06	0.2	0.03	0.1	0.12	0.42
22 Damco	1	138.7	4.1	2.9	63.8	32	15	0.03	-3.48	-3	0.05	0.07	0.03	0.03	0.09	0.13
23 Farmada	2	125.6	18	13.4	32	21.6	67.6	0.14	1	0.94	0.84	1.13	0.22	0.29	1.25	1.68
24 Fiege	1	119.1	17.9	8.3	85	29.6	50	0.01	0.18	0.06	0.1	0.22	0.07	0.16	0.28	0.61
25 Diera	3	117.9	2.5	2	30.5	8	72.8	0.04	2.08	-33.79	0.19	0.24	0.05	0.07	0.52	0.68
26 ID Logistics	3	111.8	2.6	-1.3	36.8	-3.5	46.7	-0.02	-5.06	-0.78	-0.12	0.2	-0.04	0.08	-2.08	6.95
27 Uni-Logistics	1	102.4	3	1.7	22.3	4.5	50	0.22	0.54	0.57	0.08	0.14	0.02	0.03	0.37	0.67
28 Seifert	2	89.6	2.6	2	22.1	4.8	26.9	0.19	0.29	0.21	0.18	0.24	0.05	0.06	0.83	1.1
29 IFB	3	55	2.6	2	13	3.7	66.1	0.19	0.26	0.25	0.47	0.59	0.11	0.14	1.85	2.37
30 PartnersPol	1	54.2	1.4	0.8	15.7	7.7	47.3	0.02	8.45	-3.28	0.05	0.09	0.02	0.03	0.1	0.19
31 Allport	3	53.8	3.1	2.6	14.3	7.8	61.6	0.12	0.12	0.22	0.57	0.67	0.15	0.17	1.07	1.26
32 DSV	3	51.8	2.3	0.3	27.8	8.1	22.4	0.47	0.32	-0.52	0.02	0.23	0.01	0.13	-0.04	0.83
33 Marathon	2	48.8	11.8	5.4	45	13.2	51.7	0.16	0.57	2.09	0.23	0.54	0.22	0.48	0.79	1.84
34 VGL	2	6.6	0.7	8.2	15.5	13.2	64	0.32	2.25	0.96	1.06	0.1	2.52	0.22	1.25	0.11
	76	564.2	36.7	17.5	350.7	104.5	54.4	0.19	0.47	-0.13	7.65	11.74	5.46	5.75	22.71	55.34

Note: Variables: N, number of observations; Sales, sales revenue in million PLN; EBITDA, earnings before interests, tax, depreciations, and amortization in million PLN; NR, net result in million PLN; TA, total of assets in million PLN; E, sum of equity in million PLN; NPS, net promoter score in absolute figures (-100,100); GRS, growth of sales; GRE, growth of EBITDA; GRNR, growth of net result; ROA, ratio of net result and total of assets; ROAE, ratio of EBITDA and total of assets; ROS, ratio of net result and total of assets; ROSE, ratio of EBITDA and total of sales; ROE, ratio of net result and equity; ROEE, ratio of EBITDA and equity.

Source: Author's compilation based on 76 observations, from the EMIS database, 2018; and "Operator Logistyczny Roku" Eurologistic reports.