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A preliminary panel data study about the progress of media richness

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Abstract: The selection and use of communication media has been the center of attention for a great number of scholars in the area of organizational communication for its importance in the attainment of organizational objectives. This paper presents the results of a preliminary research in order to establish a framework where to analyse the progress of communication media richness. With this aim, the paper presents an experimental study on several online discussion forums with data panels. The results suggest time factor is essential to understand the evolution of media richness.

Keywords: Channel Expansion Theory, Panel Data, Media Richness

1. Introduction

The selection and use of communication media has, for decades, been the center of attention for a great number of scholars in the area of organizational communication. Nevertheless, an agreed theory does not exist on the selection and the use of such media, but rather the opposite. The channel expansion theory combines elements of media richness theory with certain characteristics of influence and social presence theories. However, investigations about this theory have a static cross-sectional design, a snapshot of channel expansion theory rather than a longitudinal analysis, which allows for the evolution of media richness to be observed over time. For this reason, we develop a panel data research on a particular medium richness, as a pilot study for the rest of communication media.

2. Theoretical Framework

Channel expansion theory (Carlson & Zmud, 1999) is based on media richness theory and social influence theory, as well as other theories on the selection and use of media such as situational factor theory (Trevino et al., 1987) and social presence theory (Short et al., 1976). Channel expansion theory maintains the concept of media richness as a crucial element in the selection and use of media; however, the conception that media richness is constant in all situations and for all individuals in an organization disappears. The experience with a communication channel has been evaluated in terms of time length (Fulk, 1993) or the number of times that a channel has been used (Rice & Love, 1987); however, channel expansion theory suggests that knowledge-building experiences have a greater effect on selection and use of communication media than these variables. In short, this theory considers that the selection and use of communication media depends on the perception of the members of an organization based on the existing knowledge base of each communication media available. Carlson and Zmud (1999) identified four knowledge-building experiences: experience with the channel, experience with the subject, experience with the communication partner and experience with the organizational context. The literature suggests that experience with a communication channel by an individual will allow him to learn the characteristics, the options, the uses and the limitations of the channel, allowing him to use the communication channel more efficiently based on the task required and increasing the perception of richness of the channel.

The investigation by Timmerman and Madhavapeddi (2008) replied to the original study by Carlson and Zmud (1999) with electronic mail and two new communication media: face to face and the telephone. The results obtained from that investigation suggested that perceptions of a medium's richness are positively related to knowledge-building experiences with the medium, the communication partner, topic, and social influences. These relationships are fairly consistent between face-to-face, telephone and email. Differences in richness are attributable to differences between the media and expansion variables appear to be selectively related to richness dimensions and these relationships vary between media.

We therefore ask ourselves the following question for investigation: How does the perception of richness in a communication media evolve over time, and how are existing relations between the knowledge-building experiences and the perception of media richness affected?

3. Methodology

We developed an experimental study with a factorial design 1 x 4 incorporating an unusual communication medium for the participants at four different moments in time. More specifically, the investigation reported in this paper is part of a longitudinal study (consisting of four data collection points, t0, t1, t2 and t3) where progress in the perception of media richness and the different determinants that have been exposed in the literature revision.

A distance postgraduate business course from a large European public university was the main source of data for this investigation. 95 students decided to volunteer to participate in the investigation. Due to the distance nature of the course, the main working and communication tool between students and lecturers was the educational platform Moodle. The course lecturers introduced an online discussion forum on the educational platform, with the objective of offering a place where students and lecturers could ask, respond and discuss any topic related to the course.

The measurements used in this investigation include original items from the investigation by Carlson and Zmud (1999) and several complementary items based on results and notable contributions from more recent investigations.

4. Results and discussion

Panel data analysis has become a very popular technique in the analysis of longitudinal data in social and behavioral sciences. This technique allows for the independent analysis of a set of individuals over the while at the same time being undertaking a cross sectional study and longitudinal one. Using standard model, we develop several analytical model types different to panel data. The first model analyzed is the constant coefficient model, where both the intercepts and the slopes are constant. In this model it is considered that there are neither significant differences between the individuals in the study nor significant differences in temporary effects. This model is commonly known as the pooled regression model:

$$PMR_{it} = a + b_1 \times ChaExp_{it} + b_2 \times TopExp_{it} + b_3 \times PartExp_{it} + b_4 \times Suver_{it} + e_{it} \qquad (1)$$

From the pooled regression model, two models have been proposed. Model A only considers the traditional explanatory variables proposed by Carlson and Zmud (1999): experience with the channel, experience with the subject, and experience with the communication partner. The results show that experience with the channel and experience with the communication partner are significant deciding factors in the perception of a communication media's richness ($p<0.001$). However, experience with the topic is not significant ($p=0.139$).

These results agree with those originally obtained by Carlson and Zmud (1999) and later by Timmerman and Madhavapeddi (2008).

Model B includes the explicit variable of channel supervision proposed by Barry and Fulmer (2004). The results show that the inclusion of this variable in the model is not significant (p=0.197) and does not improve the explanation of perceived richness of a communication channel.

Table 2: Results of regression analysis.

Variable	Model A	Model B	Model C
Constant	1.120***	1.084***	1.084***
ChaExp	0.371***	0.356***	0.342***
TopExp	0.092	0.090	0.072
ParExp	0.307***	0.291***	0.270***
Surv		0.380	0.049*
Q2			0.224***
Q3			0.183**
R2	0.424	0.428	0.458
Change in R2		0.004	0.030

*** p<0.001; ** p<0.01; * p<0.1

Model C considers that the explicit variables affect individuals equally (cross section) and that the variables are different due to their differentiating characteristics, measured by means of an intercept. This type of model in panel data analysis is known as a fixed effects model. For this, the intercepts i are associated with dummy variables with specific coefficients for each temporary unit (Q2 and Q3), which must be estimated.

$$PMR_{it} = a_1 + a_2 \times Q_2 + a_3 \times Q_3 + b_1 \times ChaExp_{it} + b_2 \times TopExp_{it} + b_3 \times PartExp_{it} + b_4 \times Suver_{it} + e_{it} \quad (2)$$

The results show that the explicit variables (channel experience and experience with the communication partner) have constant slopes for all individuals but the intercepts vary significantly (p<0.001, y p=0.005 respectively) according to the time. These results suggest that the channel perceived richness by different individuals is different but that the variations due a change in acquired experiences (channel experience, and experience with the communication partner) influence in a similar and significant way between all individuals over time.

Finally, another fixed effects model was tried where the intercepts and the slopes vary according to time. In order to formulate this regression model, we have had to include not only dummy variable, but also their interactions with the explicit variables of the model.

$$PMR_{it} = a_1 + \sum_{j=2}^{3} a_j \times Q_j + \sum_{k=1}^{4} b_k \times X_{kit} + \sum_{j=2}^{3} \sum_{k=1}^{4} g_{jk} \times Q_j \times X_{kit} + e_{it} \quad (3)$$

Where X_k represents each one of the four explicit variables of the previous models (channel experience, topic experience, experience with the communication partner, and channel supervision). The results obtained show that all the multiplicative terms are not significant ($p > 0.05$). Because of this we can maintain that the explicit variables do not vary according to time, and suggest model C as the one that adapts more easily to situation under study.

5. Conclusions

The results of the investigation show that the richness of a communication media is constructed socially and is related mainly to experience with the media and with the communication partner. This result suggests that employee training in the use of communication media, as well as activities that establish constant communication between the members of an organization can increase the efficiency of organizational communications. These implications are supported from two points of view. On the one hand, critical mass theory (Markus, 1987), and on the other hand, the development of knowledge-building experiences needs time for their correct assimilation by members of the organization. In the same way as the investigation by D'Urso and Rains (2008), the results suggest the importance of general acceptance in the use of new communication media (e.g instant messaging) by the members of an organization, since the usefulness and richness perception is socially created by them, and must be created from the development of knowledge-building experiences rather than only their use. Some investigations had suggested (e.g. Timmerman and Madhavapeddi (2008)) that the relation between experiences based on knowledge and perceived media richness could vary over time.

The results obtained from the fixed effects model where the intercepts and the slopes vary according to time show that is not the case. The effects in the variability of knowledge-building experiences on the perceived media richness are constant over time; however, the time factor also has a significant effect on the richness perception, as in the fixed effects model where the intercepts vary according to time but are fixed according to the individuals (Model C in table 2). As the majority of investigations have verified, the simple repetition in the use of a communication media is not a factor which explains the variability of the perceived richness, which is why we think that this effect could be measured by other knowledge-building experiences that are not presently explained in the literature and which should be analyzed by an inductive investigation rather than a cross-sectional or longitudinal/quantitative investigation.

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