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Introduction

The explosion of activities associated with the production, processing and transfer of information has been matched by the development of inexpensive and relatively simple to use new information technologies in the 1980s which have provided inter alia new telecommunication services available to consumers. Despite the interest in and use of the new telecommunication media such as electronic mail, telefax and various forms of teleconferencing, there has been little research exploring the impact of such new electronic media on communication behaviour. Moreover, there is a lack of conceptual development which explains choice behaviour relating to these media at the individual level. There is an evident need for a conceptualization which attempts to explain under which communication contexts specific telecommunication media choices are made and how these choices are made.

The Department of Economic and Social Geography at the Vienna University of Economics and Business Administration and the Socio-Economic Institute at the University of Zurich are currently making more substantial efforts to fill this gap in the literature by carrying out a joint research project on communication behaviour in universities. The research is undertaken within the Network on European Communication and Transport Activity Research (NECTAR), a scientific network consisting of scholars from 19 countries who are sponsered by the European Science Foundation.

The paper presents a general methodology for the analysis of communication media choice behaviour in academia which integrates an experimental design procedure into a discrete choice framework. The approach is micro-based and introduces various institutional, mobility-related, time and cost barriers as shift variables. The university setting was chosen to be an appropriate starting point from which to empirically test the methodology.

For this purpose, face-to-face interviews were conducted in three major universities in Austria (University of Vienna, Technical University of Vienna, Vienna University of Economics and Business Administration) and in Switzerland (University of Zurich, Swiss Federal Institute of Technology, University of Fribourg). In contrast to Fischer et al. (1990) the major focus in this contribution is on cross-national differences in media choice behaviour.

The paper is organized as follows. Section 2 discusses the conceptual framework and the methodology. The third section describes the empirical context and presents the analysis of the data and discussion of the results while some general conclusions are presented in the final section.

Conceptual Framework and Methodology

In accordance with Fischer et al. (1990) the communication media choice process is conceptualized in this paper as including the following stages (see Figure 1):

First, the communication initiator becomes aware of a need to communicate in a specific context. The initiator has individual characteristics (especially characteristics such as profession and status, age, keyboard and typing skills, attitudes towards computer technology) and works in a department with specific characteristics (especially concerning cost control norms, media access and usage rules etc.).

Second, given the initiator´s awareness of the communication context it is postulated that characteristics of the message to be communicated (such as its complexity, volume, urgency and confidentiality) and characteristics of the initiator-recipient relationship (such as status effects, location of the recipient, familiarity with the recipient, awareness of recipient´s media dislikes) influence the formation of communication media preferences.

Third, the initiator is assumed to have knowledge of the characteristics of the communication media. The conceptualization focuses on perceptions and feelings related to media characteristics rather than objective characteristics (such as cost of use, accessibility, ease of use, reliability of time delivery, reliability of success delivery). The link between objective and perceived characteristics is very difficult to analyse and outside the scope of the study.

Finally, there are three types of constraints acting on the preferences, namely institutional constraints, time and cost related constraints. The variables

Figure 1: A Conceptual Framework for Media Choice Behaviour

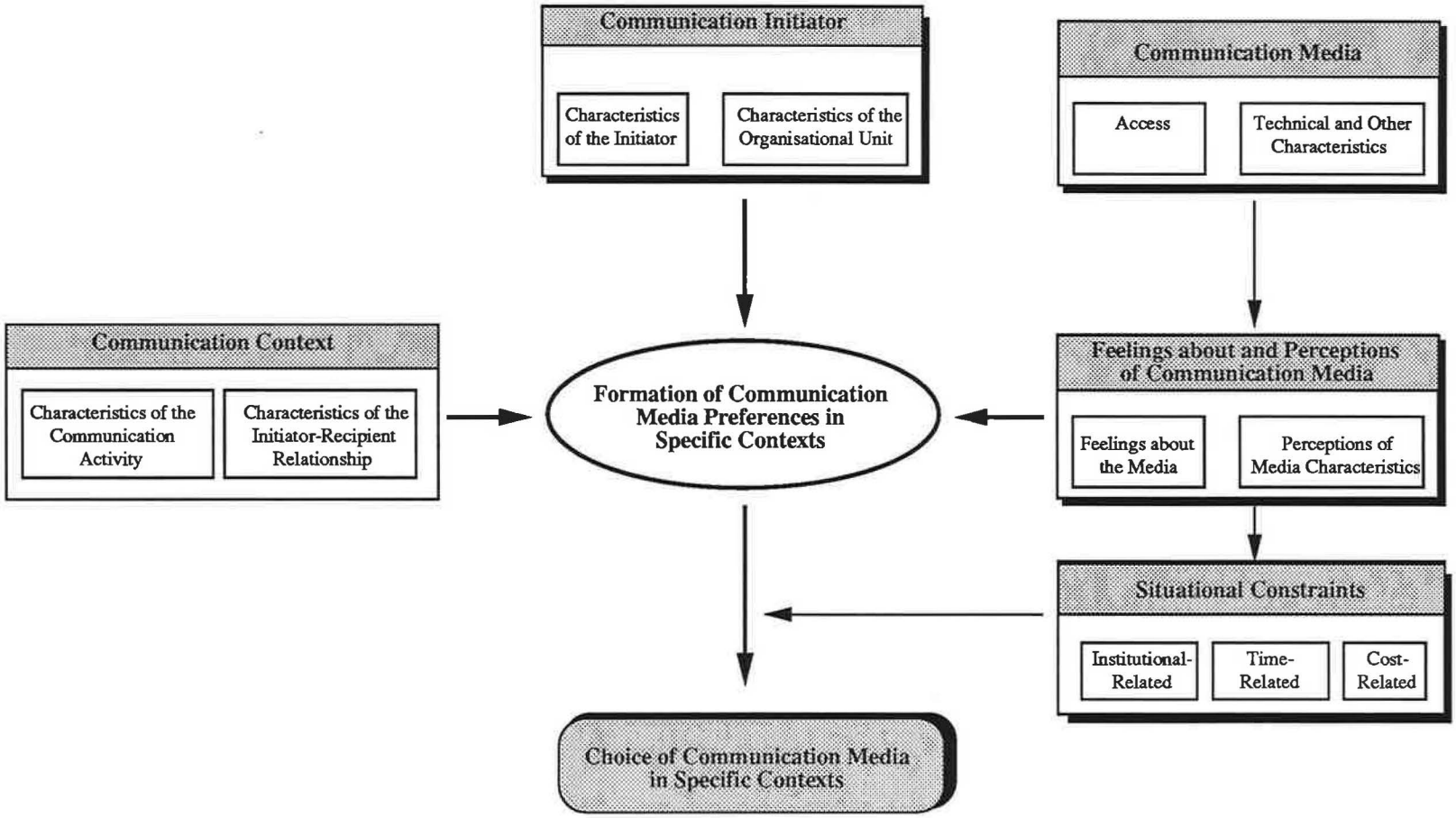

Table 1: Important Variables Characterizing the Media Choice Situation

Important Variables

A. Communication Context

Characteristics of the Communication Activity

* Complexity of Communication
* Volume of Communication
* Urgency
* Confidentiality

Characteristics of the Initiator-Recipient Relationship

* Status Effects
* Location of the Recipient
* Familiarity with the Recipient
* Awareness of Recipient´s Media Dislikes

B. Communication Initiator

Characteristics of the Initiator

* Profession and Status
* Age
* Sex
* Keyboard and Typing Skills
* Attitudes towards Computer Technology

Characteristics of the Organisational Unit

* Cost Control Norms
* Secretarial Availability
* Media Access and Usage Rules

C. Communication Media

Feelings about the Communication Media

* Trendiness of the Media
* Familiarity with the Media

Perceptions of the Communication Media

* Cost of Use
* Accessibility
* Ease of Use
* Reliability of Time Delivery
* Reliability of Success Delivery

considered to be important for modelling communication media choice in academia are summarized in Table 1.

Testing the conceptual framework is based on a micro-based approach which combines the stated preference data and the discrete choice modelling approaches. The stated preference data approach widely used in market research offers an attractive empirical setting in which individual communication behaviour can be analyzed within the context of discrete choice modelling (see for example Bates 1988; Hensher et al. 1988; Wardman 1988).

The Stated Preference Data Approach

The stated preference data approach enables to analyse different communication media choice situations while allowing to determine the influence of contextual variables. A basic feature of this approach is that individuals are exposed to a set of hypothetical choice experiments in form of either preference ranking/rating or choice selection generated by some controlled experimental design procedure so that the independent variables can be made truly independent. Of course, it is important that the choice experiments realistically approximate actual communication situations.

Choice selection designs used here are the easiest to complete and the best understood. Survey respondents had to respond to multiple communication contexts, each described by carefully chosen independent variables. Behavioural responses were then measured in reference to these experimentally designed choice contexts rather than in actual communication situations. Theoretical reasoning and exploratory analysis revealed that confidentiality of communication, urgency of communication, complexity of the content of communication and volume of the message were important contextual variables to be used to design the questionnaire contexts. Each of the variables (with two predefined attribute levels) were incorporated into an experimental design for the media choice situation with $2^4 = 16$ different hypothetical choice contexts (see Table 2).

Table 2: The Fractional Design for Media Choice

Block	Confidentiality	Urgency	Complexity	Volume
Block 1	confidential	urgent	simple	short
Block 2	not confidential	not urgent	complex	long
Block 3	confidential	not urgent	simple	short
Block 4	not confidential	urgent	complex	long
Block 5	confidential	urgent	simple	long
Block 6	not confidential	not urgent	complex	short
Block 7	confidential	not urgent	simple	long
Block 8	not confidential	urgent	complex	short
Block 9	confidential	urgent	complex	short
Block 10	not confidential	not urgent	simple	long
Block 11	confidential	not urgent	complex	short
Block 12	not confidential	urgent	simple	long
Block 13	confidential	urgent	complex	long
Block 14	not confidential	not urgent	simple	short
Block 15	confidential	not urgent	complex	long
Block 16	not confidential	urgent	simple	short

Each questionnaire contained two media choice contexts. Each choice context was presented on a card, in terms of a short description of each context variable and - if possible - a pictorial or graphical representation. An example of the wording of one of these contexts is presented below:

> *A colleague you already know for some time is organising a one-day symposium where you will take part and present a paper. The symposium will take place in three weeks time. The organizer would like to send the abstracts to all participants a good time before the symposium starts so that they can serve as a basis for discussion. You have prepared* ***two pages****, containing a short text,* ***one illustration and one table****. Your colleague is working at the University of Munich. The abstract should reach him within the time period of* ***two weeks****.*

The second context in this pair was composed of exactly the opposite set of levels on each of the four variables (simple, confidential, urgent and long message). Each of these pairs of contexts were equally distributed throughout the questionnaire and randomly assigned to the interviewees. Interviewers reported only few problems with the choice experiment. Respondents were also asked a variety of personal background questions.

The Discrete Choice Modelling Approach

Discrete choice models have been applied almost exclusively to observed choices. Such an approach has obvious limitations for predicting demand for a new event, such as the introduction of radically new telecommunication media. There is, however, no logical reason why the discrete choice modelling approach cannot be applied to analyse data from an appropriately designed choice experiment. Experimental design procedures for choice models have been considered recently by Louviere and Hensher (1983). Discrete choice models such as multinomial logit, nested multinomial logit and multinomial probit models are now well established model approaches which are applied in a wide range of fields (see Ben-Akiva and Lerman 1985, Fischer and Nijkamp 1985). Thus, it is not necessary to review the discrete choice modelling approach in detail, except for some specifics of the application in the empirical section of this paper.

It is assumed that an individual´s preferences among the available communication media alternatives (traditional mail, courier mail, telephone, facsimile and electronic mail) can be described by a utility function and that

the individual selects the alternative with the greatest utility. The utility of an alternative is represented as the sum of a deterministic component and a random component:

$$u_{ia} = V(x_{ia}, \theta) + \varepsilon_{ia} = v_{ia} + \varepsilon_{ia} \qquad (1)$$

where $V(x_{ia}, \theta) = v_{ia}$ is the deterministic component of utility, x_{ia} a vector of observed characteristics of the individual i and the communication media alternative a, θ a vector of parameters and ε_{ia} is the random component relating to faulty perception of the choice options, idiosyncratic preferences, neglected choice-relevant attributes etc. The parameters are estimated from the data by means of the method of maximum likelihood.

In general, it is assumed that the choice structures are compensatory in nature, i.e. V is linear in θ:

$$V(x_{ia}, \theta) = \sum_{k} \theta_k \; x_{iak} \qquad (2)$$

where θ_k is the k-th component of θ and x_{iak} is the k-th component of x_{ia}.

In this paper it is assumed that the ε´s are independently and identically Gumbel distributed. Thus we confine ourselves to the linear-in-parameters multinomial logit (MNL) model, the simplest and most convenient functional form of a discrete choice model:

$$P(a \mid x_{ia}, \theta) = \exp v_{ia} \; / \; \sum_{b \varepsilon A} \exp v_{ib} \qquad (3)$$

where $P(a \mid x_{ia}, \theta)$ denotes the probability that a randomly chosen individual i will choose alternative a from the set A of communication media. The details of the data and model specifications are discussed later.

Analysis and Results

The target population of this study is made up by the scholars associated with an Austrian or Swiss university. The survey population is restricted to those scholars associated with one of the following universities: University of Vienna, Technical University of Vienna, Vienna University of Economics and Business Administration, University of Zurich, Swiss Federal Institute of Technology (Zurich) and University of Fribourg. The sample design used relies on exogenous stratification (proportionate stratification). The dimensions for stratification were the status of the scholar (full professor and assistant professor/docent), the type of university and the type of department. The sampling fractions were chosen to be equal to the population shares. Consequentely, the sample likelihood of the stratified sample reduces to that of random sampling (see Ben-Akiva and Lerman 1985, p. 235). The drawing of observations out of each stratum was done randomly and produced a total of 326 questionnaires.

In order to clarify the effects of context variation on media choice preferences several context-specific MNL-models were estimated. Börsch-Supan´s HLOGIT program was used for estimating the models. HLOGIT estimates maximum likelihood parameters, utilizing a Marquardt-type modified Newton-Raphson procedure. All MNL-models require one alternative in the choice set to serve as a base of the utility scale. The traditional mail option is deliberately chosen as the base alternative.

Three standard goodness of fit measures were used: Rho-squared, rho-squared bar and the prediction success. Rho-squared is the standard likelihood ratio index which indicates how well the model explains preferences relative to the market shares model where all parameters in the model except the alternative specific constants are set to zero. Rho-squared (ρ^2) is defined as

$$\rho^2 = 1 - L^*(\hat{\theta}) / L(\mathbf{C}) \qquad (4)$$

where $L^*(\hat{\theta})$ denotes the value of the log likelihood function at its maximum and $L(\mathbf{C})$ the value of the log likelihood function when only alternative-specific constants are included. This measure is useful in comparing two specifications. Even if there are no general guidelines for when a ρ^2-value is

sufficiently high, McFadden (1979) has suggested that values of between 0.2 and 0.4 can be considered to represent a very good fit. A major shortcoming of this measure, however, lies in the fact that it will always increase or at least stay the same whenever new variables are added to the utility function. For this reason we also use the adjusted rho-squared bar

$$\rho^{-2} = 1 - (L^*(\hat{\theta}) - K) / L(\mathbf{c}) \qquad (5)$$

with K denoting the number of parameters. Another informal goodness-of-fit measure refers to the percentage of correct ex-post predictions (the so-called prediction success) which counts those observations for which the model predicted the same communication medium choice as was actually observed.

Three types of variables are taken into consideration. The first type of variables attempts to measure the influence of feelings about and perceptions of communication media characteristics. The generic variable (familiarity with the communication media) and the alternative-specific variable accessibility, specific to e-mail, are included. The second type of variables refers to characteristics of the message, such as confidentiality and volume of communication as well as the urgency and complexity of communication. These variables are obviously alternative specific. The third type concerns alternative specific constants. They are introduced for all alternatives except traditional mail which is used as the reference alternative. They capture the effects of unobserved factors and individual idiosyncracies influencing choice decisions.

Three major types of media choice models were estimated:

* **general media choice models** with the base model estimated on the full sample size of 645 observations (326 questionnaires á two choices minus 7 missing data) and the national-split models relying only on national segments of the data,

* **urgency-split context choice models** with the base model version relying on segments of the data corresponding to the urgency context and the national-split models on national segments of these data,

* **complexity-split context choice models** with the base model version relying on segments of the data corresponding to the complexity context and the national-split models on national segments of these data.

The national split models may be used to clarify country-specific effects on media preferences.

The results of the 15 communication media choice models are presented in Tables 3, 4 and 5. Table 3 shows the parameter estimates and the goodness of fit statistics used for the general choice models, Table 4 those for the urgency-split context and Table 5 those for the complexity-split context choice models. The urgency-split context models compare urgent and non-urgent communication contexts, while the complexity-split contexts models the importance of variables for complex and simple communication contexts.

The general, the urgency-split and the complexity-split media choice models perform reasonably well according to the goodness-of-fit measures used, the Austrian models generally slightly better than the Swiss ones. The values of the adjusted rho-squared range from 0.17 (urgency-split media choice models for Switzerland) and 0.47 (not complex message media choice model for Austria). All the significant coefficients (0.05 level of significance) have the anticipated sign. Positive coefficients reflect positive marginal utilities and negative coefficients negative marginal utilities.

Analysis of the media perceptions showed that traditional mail, with over 39 % of the preferences, was the dominant communication medium. Facsimilie and telephone were preferred in about 23 % of the cases, each, while e-mail and courier mail, each with about 7 %, were preferred relatively infrequently. There are only slight cross-national differences.

Tables 3 - 5 clearly indicate the influence of different institutional environments in Austria and Switzerland on preferences for communication media through varying levels of significance of the explanatory variables. Urgency of the message is the only variable highly significant in all contexts across the two countries (see Tables 3 and 4). This indicates that this variable is important regardless of the situation. The variable tends to be slightly more important in the Austrian than in the Swiss case. The same is true for the variables complexity and volume of communication (specific to telephone).

Table 3: Parameter Estimates of the General Media Choice Models: The Base Model and the Single National Models (t-values in parentheses)

Variables	Generic or Alternative Specific to	Base Model		Austrian Universities		Swiss Universities	
Familiarity with the Communication Media	generic	0.27	(4.21)*	0.38	(4.39)*	0.17	(1.55)
Accessibility to the Media (1 if located in the organisational unit, 0 otherwise)	e-mail	1.83	(3.35)*	1.93	(2.97)*	1.82	(1.72)
Confidentiality of the Message (1 if confidential, 0 otherwise)	courier mail	0.01	(1.22)	0.72	(1.18)	0.27	(0.46)
	telephone	1.05	(3.17)*	1.48	(3.02)*	0.68	(1.46)
	fax	-1.52	(-4.85)*	-1.88	(-4.29)*	-1.02	(-2.23)*
	e-mail	-0.80	(-1.18)	-1.18	(-2.28)*	-0.27	(-0.46)
Urgency of the Message (1 if urgent, 0 otherwise)	courier mail	3.78	(8.08)*	4.34	(6.24)*	3.16	(4.91)*
	telephone	3.22	(8.85)*	3.61	(6.93)*	2.88	(5.54)*
	fax	4.38	(12.49)*	4.51	(9.44)*	4.37	(7.96)*
	e-mail	2.81	(7.26)*	2.82	(5.31)*	2.90	(4.70)*
Complexity of the Message (1 if complex, 0 otherwise)	courier mail	0.51	(1.24)	0.52	(0.92)	0.50	(0.81)
	telephone	-3.22	(-8.59)*	-3.45	(-6.51)*	-3.24	(-5.67)*
	fax	0.74	(2.92)*	0.59	(1.39)	0.92	(1.86)
	e-mail	-1.34	(-3.47)*	-1.85	(-3.48)*	-0.68	(-1.11)
Volume of the Message (1 if long, 0 otherwise)	courier mail	1.13	(2.43)*	1.68	(2.25)*	0.59	(0.94)
	telephone	-4.28	(-9.25)*	-5.54	(-7.02)*	-3.27	(-5.66)*
	fax	0.74	(2.26)*	0.59	(1.32)	0.99	(1.98)*
	e-mail	-0.64	(-1.69)	-0.55	(-1.09)	-0.62	(-1.03)
Alternative Specific Constant	courier mail	-4.31	(-6.24)*	-4.93	(-4.54)*	-3.74	(-4.09)*
	telephone	-0.23	(-0.84)	-0.28	(-0.74)	-0.20	(-0.51)
	fax	-2.58	(-5.90)*	-1.89	(-3.37)*	-3.54	(-4.87)*
	e-mail	-2.35	(-3.76)*	-1.61	(-2.16)*	-3.59	(-2.94)*
Log-Likelihood at Zero		-1038.09		-597.10		-440.99	
Log-Likelihood at Constant		-919.60		-538.56		-379.74	
Log-Likelihhod at Convergence		-543.25		-287.52		-238.19	
Rho Squared at Market Shares (adjusted)		0.41	(0.39)	0.47	(0.43)	0.38	(0.33)
Prediction Success (in %)		68.7		71.2		70.4	
Observed (Predicted) Media Preferences (in %):							
Courier Mail		7.1	(2.6)	7.5	(8.9)	6.6	(0.0)
Telephone		23.0	(28.7)	23.2	(27.5)	22.6	(21.2)
Fax		23.3	(27.3)	24.0	(20.8)	22.3	(34.7)
Electronic Mail		7.4	(1.4)	8.4	(4.0)	6.2	(0.7)
Traditional Mail		39.2	(40.0)	36.9	(38.8)	42.3	(43.4)
Number of Observations		645		371		274	

t-value significant at the 0.05 level

Table 4: Parameter Estimates of the Urgency-Split Media Choice Models: The Base Models and the Single National Models
(t-values in parentheses)

Variables	Generic or Alternative Specific to	Base Models				Austrian Models				Swiss Models			
		Urgent Message		Not Urgent Message		Urgent Message		Not Urgent Message		Urgent Message		Not Urgent Message	
Familiarity with the Communication Media	generic	0.23	(2.66)*	0.34	(3.39)*	0.36	(2.99)*	0.39	(3.13)*	0.09	(0.67)	0.33	(1.80)
Accessibility to the Media (1 if located in the organisational unit, 0 otherwise)	e-mail	2.19	(2.86)*	1.39	(1.76)	2.64	(2.43)*	1.31	(1.58)	1.67	(1.51)	17.01	(0.00)
Confidentiality of the Message (1 if confidential, 0 otherwise)	courier mail	-0.37	(-0.62)	1.80	(1.64)	0.05	(0.05)	14.54	(0.02)	-0.85	(-0.99)	1.32	(1.11)
	telephone	0.15	(0.25)	1.45	(3.33)*	1.24	(1.23)	1.51	(2.59)*	-0.74	(-0.91)	1.49	(2.27)*
	fax	-2.15	(-4.18)*	-1.67	(-2.56)*	-2.23	(-3.06)*	-2.57	(-2.41)*	-1.94	(-2.68)*	-0.76	(-0.82)
	e-mail	-1.43	(-2.25)*	-0.83	(-1.48)	-1.94	(-2.00)*	-0.84	(-1.27)	-0.84	(-0.94)	-1.21	(-1.01)
Complexity of the Message (1 if complex, 0 otherwise)	courier mail	0.02	(0.04)	0.67	(0.76)	-0.54	(-0.58)	0.02	(0.02)	0.16	(0.18)	1.04	(0.87)
	telephone	-3.70	(-5.57)*	-3.10	(-6.12)*	-5.41	(-4.32)*	-2.87	(-4.66)*	-3.09	(-3.77)*	-4.01	(-3.58)*
	fax	0.18	(0.34)	1.26	(2.10)*	-0.71	(-0.79)	0.70	(1.05)	0.70	(0.97)	18.12	(0.00)
	e-mail	-2.00	(-2.92)*	-1.02	(-1.91)	-4.02	(-3.29)*	-1.12	(-1.74)	-0.55	(-0.62)	-0.87	(-0.85)
Volume of the Message (1 if long, 0 otherwise)	courier mail	1.45	(2.45)*	1.52	(1.37)	2.20	(2.27)*	0.27	(0.21)	0.57	(0.69)	17.44	(0.00)
	telephone	-4.03	(-5.73)*	-3.93	(-5.99)*	-5.88	(-4.69)*	-19.16	(-0.01)	-3.05	(-3.47)*	-2.76	(-3.73)*
	fax	1.23	(2.49)*	0.06	(0.12)	0.69	(0.97)	0.63	(0.95)	1.62	(2.32)*	-0.89	(-0.97)
	e-mail	0.06	(0.09)	-1.17	(-2.22)*	-0.48	(-0.46)	-0.78	(-1.24)	0.40	(0.45)	-2.14	(-1.82)
Alternative Specific Constant	courier mail	0.18	(0.22)	-5.57	(-3.57)*	0.26	(0.19)	-16.95	(-0.02)	0.34	(0.31)	-21.01	(-0.01)
	telephone	3.80	(5.44)*	-0.55	(-1.70)	4.90	(4.01)*	-0.46	(-1.09)	3.52	(3.87)*	-0.80	(-1.54)
	fax	2.27	(3.38)*	-2.43	(-3.78)*	3.77	(3.38)*	-1.91	(-2.49)*	1.16	(1.29)	-19.26	(-0.00)
	e-mail	0.55	(0.52)	-1.82	(-2.24)*	2.11	(1.28)	-1.35	(-1.54)	-0.74	(-0.49)	-17.78	(-0.00)

Table 4 (ctd.)

Log-Likelihood at Zero	-518.24		-515.02		-297.75		-299.36		-220.49		-220.49	
Log-Likelihood at Constant	-454.30		-311.62		-259.24		-189.78		-193.99		-119.63	
Log-Likelihood at Convergence	-309.42		-225.27		-150.42		-129.55		-143.04		-81.70	
Rho-Squared at Market Shares (adjusted)	0.32	(0.28)	0.28	(0.22)	0.42	(0.35)	0.32	(0.22)	0.26	(0.17)	0.32	(0.17)
Prediction Success (in %)	64.0		76.8		66.5		74.7		63.5		78.8	
Observed (Predicted) Media Preferences (in %)												
Courier Mail	12.1	(0.9)	2.2	(0.0)	13.5	(14.6)	1.6	(0.0)	10.2	(0.0)	2.9	(0.0)
Telephone	29.5	(37.3)	16.4	(14.3)	129.2	(35.7)	17.1	(14.5)	29.9	(25.5)	15.3	(10.9)
Fax	40.7	(57.1)	5.9	(0.0)	41.1	(43.2)	7.0	(0.0)	40.1	(59.9)	4.4	(0.0)
Electronic Mail	9.0	(4.7)	5.9	(0.3)	9.2	(6.5)	7.5	(2.2)	8.8	(1.5)	3.7	(0.0)
Traditional Mail	8.7	(0.0)	69.6	(85.4)	7.0	(0.0)	66.7	(83.3)	11.0	(13.1)	73.7	(89.1)
Number of Observations	322		323		185		186		137		136	

* t-value significant at the 0.05 level

Table 5: Parameter Estimates of the Complexity-Split Media Choice Models: The Base Models and the Single National Models
(t-values in parentheses)

Variables Complex	Generic or Alternative Specific to	Base Models Complex Message		Base Models Not Complex Message		Austrian Models Complex Message		Austrian Models Not Complex Message		Swiss Models Complex Message		Swiss Models Not Complex Message	
Familiarity with the Communication Media	generic	0.16	(1.71)	0.45	(4.48)*	0.29	(2.32)*	0.53	(4.04)*	0.00	(0.02)	0.45	(2.60)*
Accessibility to the Media (1 if located in the organisational unit, 0 otherwise)	e-mail	14.68	(0.03)	1.06	(1.81)	14.99	(0.02)	1.42	(2.00)*	14.92	(0.02)	0.55	(0.49)
Confidentiality of the Message (1 if confidential, 0 otherwise)	courier mail	-0.03	(-0.05)	1.89	(2.21)*	0.28	(0.38)	1.45	(1.16)	-0.44	(-0.61)	1.87	(1.54)
	telephone	2.12	(2.69)*	0.80	(1.89)	2.66	(2.44)*	0.79	(1.21)	1.24	(1.06)	0.84	(1.48)
	fax	-1.56	(-4.04)*	-1.24	(-2.27)*	-1.73	(-3.21)*	-2.46	(-2.78)*	-1.33	(-2.33)*	-0.31	(-0.37)
	e-mail	-0.63	(-1.09)	-0.72	(-1.38)	-0.76	(-0.90)	-1.73	(-2.15)*	-0.54	(-0.65)	0.25	(0.30)
Urgency of the Message (1 if urgent, 0 otherwise)	courier mail	3.53	(6.25)*	4.53	(5.11)*	4.11	(4.80)*	5.18	(3.97)*	2.98	(3.82)*	3.88	(3.16)*
	telephone	2.64	(4.93)*	4.44	(6.83)*	2.58	(3.90)*	7.00	(5.60)*	3.33	(2.88)*	3.00	(4.30)*
	fax	3.95	(9.47)*	5.54	(7.84)*	4.07	(7.06)*	6.59	(5.76)*	3.91	(6.26)*	17.59	(0.04)
	e-mail	2.24	(3.75)*	4.04	(6.31)*	1.34	(1.42)	5.79	(5.05)*	3.00	(3.26)*	3.15	(3.48)*
Volume of the Message (1 if long, 0 otherwise)	courier mail	1.34	(2.63)*	0.10	(0.09)	1.97	(2.53)*	13.10	(0.01)	0.60	(0.85)	0.10	(0.08)
	telephone	-17.85	(-0.01)	-4.90	(-7.93)*	-18.98	(-0.01)	-7.69	(-6.33)*	-18.05	(-0.01)	-3.22	(-4.91)*
	fax	0.93	(2.47)*	-0.10	(-0.14)	1.03	(1.98)*	-1.41	(-1.53)	0.79	(1.43)	1.56	(1.26)
	e-mail	0.56	(0.96)	-2.00	(-3.53)*	1.08	(1.21)	-2.87	(-3.32)*	0.23	(0.28)	-1.65	(-1.91)
Alternative Specific Constant	courier mail	-3.75	(-5.61)*	-4.24	(-3.17)*	-4.45	(-4.13)*	-16.56	(-0.01)	-3.08	(-3.65)*	-4.21	(-2.51)*
	telephone	-4.00	(-4.94)*	-0.21	(-0.65)	-4.29	(-3.84)*	-0.04	(-0.08)	-4.14	(-3.03)*	-0.50	(-1.07)
	fax	-1.91	(-4.87)*	-2.28	(-3.09)*	-1.66	(-3.19)*	-0.38	(-0.50)	-2.22	(-3.67)*	-16.86	(-0.04)
	e-mail	-16.99	(-0.03)	-1.10	(-1.61)	-17.10	(-0.02)	-0.20	(-0.24)	-17.78	(-0.02)	-1.92	(-1.49)

Table 5 (ctd.)

Log-Likelihood at Zero	-523.07		-515.02		-300.96		-296.14		-222.10		-218.88	
Log-Likelihood at Constant	-422.10		-448.57		-246.71		-266.47		-173.43		-179.46	
Log-Likelihood at Convergence	-279.34		-248.18		-148.71		-124.41		-122.72		-105.96	
Rho-Squared at Market Shares (adjusted)	0.34	(0.30)	0.45	(0.41)	0.40	(0.32)	0.53	(0.47)	0.29	(0.19)	0.41	(0.31)
Prediction Success (in %)	69.8		70.3		70.6		73.4		69.6		73.5	
Observed (Predicted) Media Preferences (in %)												
Courier Mail	9.2	(0.3)	5.0	(4.4)	9.6	(7.0)	5.5	(7.6)	8.7	(0.0)	4.4	(0.0)
Telephone	8.9	(13.8)	37.2	(43.4)	11.2	(13.4)	35.3	(39.1)	5.8	(14.5)	39.7	(39.0)
Fax	31.4	(36.0)	15.0	(18.1)	31.6	(29.9)	16.3	(14.7)	31.2	(35.5)	13.2	(22.8)
Electronic Mail	4.6	(0.0)	10.3	(4.1)	3.7	(0.0)	13.0	(9.8)	5.8	(0.0)	6.6	(1.5)
Traditional Mail	45.9	(49.9)	32.5	(30.0)	43.9	(49.7)	29.9	(28.8)	48.5	(50.0)	36.0	(36.8)
Number of Observations	325		320		187		184		138		136	

* t-value significant at the 0.05 level

The negative signs of the parameter estimates indicate a decrease in the odds of choosing telephone if the message is complex or long, respectively. The context variable confidentiality of the message seems to be less important, especially in Swiss universities. In these universities only confidentiality (specific to fax) is more important in urgent and complex, rather than in non-urgent and simple communication situations.

Familiarity with the communication media is significant in the Austrian case, but much less important compared to the above mentioned communication context variables. The second communication media characteristic used attempts to measure the influence of the accessibility to e-mail as perceived by the recipients. This alternative-specific variable seems to have an important influence on preference formation in the Austrian context, rather than in the Swiss one.

The coefficients of some alternative specific constants (in the general media choice models, for example, those specific to courier mail, fax and e-mail) are significantly different from zero which indicates that some choice-relevant influences have not been captured. It is worthwile to mention that several other variables had been considered such as perceived cost of use and reliability of success delivery, but they were found to be unimportant in all contexts.

The results clearly indicate the value of the methodology suggested to estimate conext-specific models. The most important empirical finding is the significant variation in the relative importance of the variables across contexts in general and cross-national contexts in particular.

Summary and Conclusions

The methodology suggested for analyzing telecommunication media choice behaviour in academia provides an attractive approach to analyse the context-specific nature of the communication media choice process and to identify cross-national differences in communication choice behaviour. The methodology allows for the influence of context at two levels. First, a range of contexts is chosen at the data collection stage, with contexts created by the use of an experimental design procedure. Second, the experimental design

allows for choice models to be estimated on context-specific segments of the data by disaggregating the data set across some context variables of interest.

The empirical results clearly indicate that communication media choice behaviour is very context-dependent. Several cross-national differences in choice behaviour were identified. First, the media characteristics familiarity with the communication media and accessibility to the media (specific to e-mail) were found to be important in explaining preferences in Austrian universities (familiarity with the communication media regardless of the communication situation), but relatively unimportant in Swiss universities. Second, the communication context variables confidentiality, urgency, complexity and volume tend to be more important in the Austrian than in the Swiss context. Finally, it is worthwile to mention that in Switzerland there is a higher preference for traditional mail while in Austrian academia a higher propensity can be observed to choose a medium other than traditional mail.

Although the approach suggested extends our knowledge significantly, there are several complex issues which remain largely unaddressed. These issues include inter alia the choice of multiple communication media and the consideration of new advanced telecommunication media such as multimedia, multipoint desktop teleconferencing which enables to connect more sites together simultaneously, but which is not yet used in Austrian and Swiss academia.

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