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Online platforms have evolved into powerful programmable architectures that enable heterogeneous groups of autonomous but interdependent users to interact. Based on a stratified sample of 1,380 companies from a newly developed enterprise survey in Austria, the analysis aims to reduce the lack of comprehensive empirical research of the general patterns and regularities of business use of online platforms across different markets and industries. We conduct a comprehensive set of (ordered) probit estimations on the determinants of platform adoption, their interaction with platform competition, their joint impact on platform users, and their overall satisfaction and willingness to pay (more) for platform services. The analysis provides ample empirical evidence of the importance of rivalry between platforms for delivering its value proposition to all participants: For instance, the estimates show that more competing platforms imply (i) greater ease of switching, (ii) a greater likelihood of negotiable and favourable terms of use, and (iii) associate positively with a greater impact on the number of business partners, revenue per customer or product variety. In turn, (iv) better impacts for business users go hand in hand with their higher satisfaction, which directly links to (v) a higher willingness to pay (more) for platform services. Conversely, the ease of switching to an alternative platform associates with a significantly lower willingness to pay (more). Competition between platforms thus increases the bargaining power of users and allows them to claim a larger share of the platform's value proposition.

JEL Codes: O33, M21, L11, L21, L86
Key Words: Digitalisation, online platforms, two-sided markets, platform competition, willingness to pay, enterprise survey

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1 Introduction

Online platforms can be defined "as a digital service that facilitates interactions between two or more distinct but interdependent sets of users (whether firms or individuals) who interact through the service via the Internet" (OECD, 2019, p. 20). As one of the most significant innovations of recent decades, they have evolved into programmable architectures for a great variety of uses, creating new value propositions through network externalities based on the digital integration of data (Mansell and Steinmueller, 2020; Van Dijck, 2021; Gawer, 2022). The enormous increase in the scalability of operations, potential efficiency gains or the configuration of new services are accompanied by a growing concern about the future contestability of these markets.

Overall, the vibrant stream of research on online platforms seems to have coalesced into a comprehensive foundation of the discipline in the form of general concepts and theories, coupled with a growing consensus on constitutive phenomenological features, economic interdependencies and strategic trade-offs. This work is complemented by a growing number of informative business cases that demonstrate the disruptive impact of online platforms in specific markets and industries.[1] However, there is a glaring lack of comprehensive and large-scale empirical studies that would attempt to identify the general patterns and regularities across different markets and industries (Rietveld and Schilling, 2021; Cheng et al, 2024).

The research reported in this paper aims to *contribute* to the literature by reducing this gap in three ways. First, we introduce a new enterprise survey that was specifically designed to analyze the business use of online platforms.[2] Second, we seek to identify critical connections within a coherent system of mutual relationships. These concern the adoption of online platforms in different domains of corporate activity, the competition between them and the perceived impacts and overall satisfaction of business users. Finally, we empirically validate our conjectures in a series of (ordered) probit estimates on a stratified sample of 1,380 Austrian firms that had participated in the survey.[3] In doing so, we pursue the following guiding questions of research:

- What are the main factors associated with the choice to participate in an online platform in different areas of corporate activity?
- What are the main impacts on business users in terms of costs, efficiency and the quality of its own products and services?
- How do these impacts relate to the overall satisfaction of business users and their willingness to pay (more) for the services?
- How does platform competition relate to the perceived impacts, overall satisfaction and willingness to pay of business users?

[1] Farrell et al (2019), Van Dyck et al (2024) or Aguiar et al (2024).

[2] The survey is available from the authors as supplementary material to this article. For other studies using the data see, e.g., Bärenthaler-Sieber et al (2023), Bilek-Steindl et al (2024A,B) and Bock-Schappelwein et al (2024).

[3] To our knowledge, the only study similar in approach is by Koski et al (2019), who more specifically investigated the adoption of social media platforms in a large sample of Finish companies.

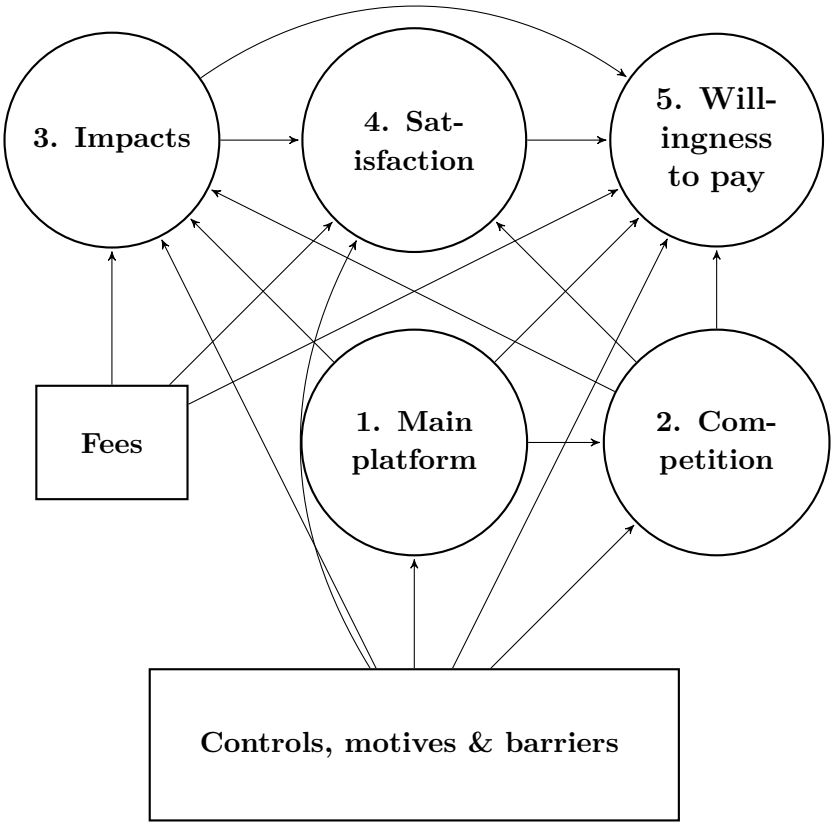
Figure 1 summarises the *heuristic model* and overall structure of our set of single regressions.[4] Despite its apparent complexity, the aim is to establish a straightforward chain of relationships: The bottom level of the chart depicts the main exogenous explanatory factors: the general control variables, the motives why companies participate in the platform and the barriers to using it. Together they may (or may not) affect a number of dependent variables shown in the two upper levels. The intermediate level focuses on market characteristics. We first estimate several equations on the adoption of what the firms consider to be their most important online platform by different areas of corporate activity (*Main platform*). A second set of equations addresses the options to switch between alternative platforms and their conduct with regard to the terms of use (*Competition*). Whether firms have to pay for using the platform (*Fees*), we take again as exogenously given. At the top level of the chart we are interested in whether fees, together with the other explanatory variables, affect the observed outcomes of participating in the online platform. Our third set of equations regards the manifold effects of using the online platform as perceived by their business users (*Impacts*). This is followed by an assessment of factors related to their overall contentment with using the services (*Satisfaction*), and finally their attitude towards paying (higher) fees for them (*Willingness to pay*).

Among selected findings, the great heterogeneity of factors associated with the firms' decision to participate in an online platform confirms the importance of controlling for the different business domains in which they are used. The further results demonstrate that competition between online platforms is a critical factor in the interplay between their adoption, impacts, satisfaction and willingness to pay of business users. A greater number of alternative providers not only means greater ease of switching between them, but companies faced with more competing platforms also rate the negotiability of the terms of use more favourably. They also report significantly more positive effects from their use, e.g. on the number of business partners, sales per customer or the variety of products they offer. Finally, the perceived better impacts are accompanied by a significantly higher satisfaction of business users, which in turn translates into a significantly higher willingness to pay (more) for participating in the platform.

Overall, the satisfaction of business users with their most important platform appears to be relatively high. This indicates that many online platforms actually succeed in realising the value proposition. However, the probit estimates also reveal at least two factors related to its distribution: First, companies that consider themselves to be relatively advanced in terms of digitalisation report more often that the terms of use for their main platform were negotiable and implemented favourably. Second, the intensity of platform competition, measured by the perceived ease of switching between alternative providers, shows a significant negative conditional correlation with the companies' willingness to pay. This suggests that stronger competition between platforms enables business customers to claim a greater share of the joint value proposition.

[4]The simultaneous estimation of a structural causal model is not feasible within the comprehensive approach of this paper. It can be attempted in further work focusing more specifically on individual relationships, such as the firm's decision to participate in an online platform.

Figure 1: Business use of online platforms: a bird's eye view



Note: The exogenous variables are framed in rectangles, the explained variables within circles.

By addressing the determinants and effects of a global new technology and business model, the questions raised and the empirical evidence presented are likely to be relevant to business strategy and economic policy beyond the national borders of Austria, or those of other small open economies in the European Union. The analysis also aims, by example, to stimulate further research and the systematic collection of empirical data in other countries. Ideally, this would allow for more comparative studies across different economic and regulatory environments in the future.

The remainder of the paper is organised as follows. Section 2 summarises the conceptual background with reference to selected contributions from the literature. Section 3 explains the data (survey design, sampling weights, etc.) and method of estimation. In Section 4, we estimate the factors that associate with the firms' participation in their most important online platform. Section 5 focuses on the competition between platforms as perceived by the business users, followed by the impacts of their use in Section 6, the overall satisfaction with the platform in Section 7 and the willingness to pay (more) for the services in Section 8. Section 9 summarizes and concludes.

2 Conceptual background

In engineering design, the term 'platform' refers to a modular architecture of related product families that allows the flexible and cost-efficient recombination of common elements (Jacobides et al, 2024).[5] In contrast, the study of online platforms is more generally embedded in a strand of research which addresses new *business ecosystems* that are based on digital technology and connectivity of data.[6] It emphasizes the co-evolution of capabilities and functions that are structured to align the interactions of autonomous actors around a focal value proposition (Moore, 1996; Adner, 2017; Kapoor, 2018). The latter result from non-generic complementarities, where an increase in one set of activities boosts the returns of another set of actions (Jacobides et al 2018).[7] Largely congruent with the concept of digital ecosystems, the term *online platform* refers to a particular architecture and governance, where algorithms regulate and structure the online interaction between autonomous users. They generally thrive in complex environments in which their modular design enables the integration of autonomous but interdependent participants via standardised interfaces (Baldwin and Woodard, 2009).[8] Platform owners regulate and orchestrate the ecosystems in order to align the various actors around the joint value proposition. They decide how to integrate the architecture, organisation and governance of the platform, define the rules, cast them into algorithms, design the incentives and choose who can interact, when and how.[9] Platforms thus represent an intermediate solution to coordination problems that is located between transactions on the free market and a hierarchical corporate organisation (Kretschmer et al, 2020).

Platform owners need to manage different groups of users (e.g., buyers and sellers) operating in distinct parts of a *multi-sided market*. They seek to create and capture value from direct (within-group) and indirect (between-group) network effects which users fail to account for in their choices.[10] Indirect network effects often imply that a user's decision to participate on one side depends on a large number of users joining on the other side, and vice versa. In an attempt to internalise these external effects, platform owners court both sides of the market. To solve the familiar "chicken-and-egg" problem, they often pursue "divide-and-conquer strategies, where participants on one side are subsidized ('divide') and profits are made on the other side 'conquer"' (Caillaud and Jullien, 2003, p. 324). As a result, the volume of transactions depends not only on the level but also on the structure of the fees paid by users on both sides of the platform (Rochet and Tirole, 2003, 2010). This explains why firms may rationally invest in providing services that they give away for free (Parker and Van Alstyne, 2005). However, attracting participation and retaining users is not only about pricing. The quality and

[5] See also Bresnahan and Greenstein (1999) or Parker and Van Alstyne (2018).

[6] Subramaniam (2020), Baldwin et al (2024), Baumann (2024), or Treves et al (2024).

[7] See also Brynjolfsson and Milgrom (2013).

[8] See also Gawer (2014) or Baldwin et al (2024).

[9] Helfat and Raubitschek (2018), Gawer (2022) or Saadatmand et al (2019).

[10] Armstrong (2006). See also Evans and Schmalensee (2016), Takagi (2020), or Belleflamme and Peitz (2021).

(perceived) impact of the platform's services will be a determinant of users' satisfaction, loyalty and, ultimately, their willingness to pay (Teh, 2022; Teh et al, 2023). Moreover, by experimenting and regulating the rules of access and further interaction, platform owners can influence which side captures more of the value created.[11] For example, they can induce greater competition between sellers, making the platform more attractive to buyers, who benefit from lower prices, more variety or better quality (Reshef, 2023). This positive external effect between groups comes at the cost of a negative intra-group external effect for sellers, who may experience a reduction in surpluses and hence lower incentives to participate. The opposite is true if platforms allow sellers to capture more surplus at the expense of buyers.[12]

To conclude, indirect *network effects* tend to shift the balance of either price or non-price instruments in favour of those set of activities that are less dependent on the network. The more users are locked in, the more likely they will be 'conquered' and experience diminishing rents. In addition, some business users have reason to fear that platform owners might use their privileged access to transaction data to enter and compete in their own market. If so, they will be more cautious than final consumers about adopting a platform, sometimes only doing so under pressure from customers or powerful suppliers.[13] Platform owners, in turn, must rapidly expand so that users on both sides expect them to dominate the market, while innovation and product differentiation remain the most effective means to overcome incumbency advantages.[14] Either way, we expect that the degree of competition between platforms, be it the number of alternative providers or the actual ease of switching between them, relates systematically to the platforms' impact on business users, their satisfaction with its services and their propensity to pay (more) for it. Taken together, we interpret these also as an indication of whether the platform's value proposition works for its customers.

3 Data and estimation

A novel business survey

This research is based on a new enterprise survey on the use of online platforms in Austrian firms, developed and conducted in 2021/22 (Bärenthaler-Sieber et al, 2023). In the *first part* of the survey, we asked about the use of online platforms, their motives and obstacles for each of the following *domains* of corporate activity:

– Sales

[11] Peitz et al (2016), Belleflamme and Peitz (2019), Spulber (2019).

[12] This can happen, for example, through targeted advertising and price discrimination based on the platforms' privileged access to consumer data, including search behaviour (Gugler et al., 2023; Bergemann and Bonatti, 2024).

[13] Kenney et al (2019), Lan et al (2019) or Zhu (2019).

[14] Biglaiser et al (2019), Casadesus and Masanell and Campbell (2019), Halaburda and Yehezkel (2019), or Halaburda et al (2024).

– Procurement
– Production and/or logistics
– Human resources (HR)
– Communication, information and advertising

The *second part* of the questionnaire provides information on the impacts of using online platforms, e.g. on sales and costs or the number of customers and business partners. The *third part* is dedicated to selected additional aspects such as the satisfaction of companies with the use of their most important platform, their assessment of the competition between them, the possibility to opt for an alternative provider, or the negotiability, clairity and implementation of the terms of use. This section also tentatively asked companies about their willingness to pay (more) for using their most important online platform, if necessary. It is these aspects that are also at the heart of the present paper. In the *fourth part* of the questionnaire, firm-specific characteristics were gathered, such as the year of foundation, integration into a corporate group, company size, turnover or export orientation. An English translation of the entire survey is available upon request from the authors.

The sample frame for the survey was obtained from Herold MD Online,[15] which contains information on 30,077 companies with at least 10 employees from the sectors of industry, construction and services.[16] From this, a sample of 9,032 companies was drawn in a two-stage procedure, taking into account company size and sector. While all companies with at least 100 employees were included in the sample, smaller companies were selected by random sampling. This prioritisation of larger enterprises reflects their presumed greater economic importance, also for business use of online platforms. At the same time, the larger number of small enterprises allows for a reliable random sampling.

In order to maximise response rates and data quality, we implemented several measures throughout the data collection process. The survey was pre-tested to ensure clarity of technical definitions and to identify potential misunderstandings. Prior to this, expert interviews helped to refine the definition of 'platform' in our research context. To reduce the burden on respondents, we designed the questionnaire using filters and simple questions rather than complex matrices. Due to legal requirements, respondents were primarily contacted by post, with both a printed questionnaire and an online option, with personalised invitations and full control over data entry.

After the necessary adjustments (duplicates, dissolved companies, bankruptcies, etc.), the net sample contained 8,600 companies. With a total of 1,380 completed questionnaires, the response rate was 16.0%. Given the complexity, length and voluntary nature of the survey, we consider this to be a good outcome. However, response rates are not uniform (Table 1). Consistent with the chosen sample design, smaller enterprises with a ratio of responses relative to their share in the sample frame of less than one are under-represented in all four sectors. Conversely, medium-sized and large enterprises are over-represented in all regions.

[15]Reference date May 26, 2021.

[16]Companies were selected from NACE sectors 10-74 (excl. 12, 34, 48, 54, 57, 67), 77-82, 95 and 96.

Table 1: Ratio of survey response rate versus sample frame shares

Size	**Small**			**Medium**			**Large**		
Region	East	South	West	East	South	West	East	South	West
Construction	0.6	0.6	0.4	2.0	2.3	2.3	2.0	3.6	5.0
Manufacturing	0.3	0.4	0.4	2.5	2.5	1.7	4.0	4.8	5.0
Services	0.8	0.9	0.9	2.2	1.6	2.0	3.0	2.8	3.6
Tourism	0.6	0.5	0.4	0.9	1.4	1.2	3.6	13.1	7.3

NB: A value of 1 corresponds to proportional representation, below 1 to under-representation and above 1 to over-representation.
Source: WIFO survey and calculations.

The sampling frame is also the basis for the final *weighting* of the data (Sand and Kunz, 2020). It takes into account both the design of the sampling ('design weighting') and differences in the structure of the company characteristics between the survey responses and the base population ('adjustment weighting'). The design weighting only relates to company size. The adjustment weighting refers to sectors, company size and region. The final weights are the product of design weight and adjustment weight (Table 2). As explained above, small enterprises must have higher weights than medium-sized and large enterprises to compensate for their lower probability of being sampled and responding. Conversely, the low weights for large enterprises reflect their full inclusion in the sample combined with a higher average response rate. To evaluate the potential impact of these (high) weights, we examined their distribution using key statistics, including the mean (21.79), median (23.60), and standard deviation (15.41). The coefficient of variation (CV = 0.71) indicates moderate dispersion, and the skewness (0.77) suggests a slight right-skew, though not extreme. With a kurtosis value of 3.15, the distribution remains close to normal. Given these findings, we do not observe excessive distortion in the weighting scheme but acknowledge the presence of some high weights.

All results refer to the weighted values, as these more closely reflect the Austrian population of companies with at least 10 employees in the respective sectors. However, we do not claim that the results are fully representative. Distortions may result, for example, from a lower response rate of firms not using online platforms with regard to general adoption rates, or from a reluctance on the part of the actual respondents to disclose their willingness to pay (more). As a meaningful and reliable correction of such biases would have gone beyond the scope and resources of the current survey, we will explicitly indicate the corresponding figures as upper limits (in the first instance) and lower limits (in the second case). In all other cases, we see no *a priori* reason to expect a systematic bias in either direction, although the general caveat applies and our analytical results should strictly apply only to the sample of companies surveyed.

Table 2: Sample weights by firm size (employees), region and sector

Size	**Small, < 50 emp**			**Medium, 50-99 emp**		
Region	East	South	West	East	South	West
Construction	36.47	34.81	52.36	30.32	27.37	21.73
Manufacturing	66.88	59.92	55.00	32.33	36.07	36.97
Services	27.75	25.13	23.60	23.13	26.85	21.74
Tourism	38.15	45.45	54.50	52.23	25.48	47.50
	Medium, 100-249 emp			**Large, >= 250 emp**		
	East	South	West	East	South	West
Construction	6.57	5.93	4.71	11.00	6.00	4.38
Manufacturing	7.00	7.81	8.01	5.40	4.57	4.37
Services	5.01	5.81	4.71	7.36	7.88	6.06
Tourism	11.31	5.52	10.29	6.00	1.67	3.00

Source: WIFO survey and calculations.

The (ordered) probit estimator

In what follows, we conduct a comprehensive set of (ordered) probit estimations that model the relationship between an ordinal dependent variable Y and one or more independent variables Z. The dependent variables are either binary or categorical and ordered, meaning that the elements have a meaningful order but no consistent interval between them. Assuming that an underlying continuous latent variable Y^* determines the observed outcome and that discrete individual choices are the "sum of myriad underlying influences" (Greene and Hensher, 2010, 14), the (ordered) probit model applies a normal distribution to estimate them from the values of the independent variables. Specifically, we can represent the latent variable as:

$$Y^* = \mathbf{Z}\lambda + \epsilon,$$

where $\mathbf{Z}$ is the vector of independent variables, λ is the vector of coefficients to be estimated, and ϵ is a normally distributed error term with mean 0 and variance 1. In ordered probit models the relationship between the latent variable and the observed ordinal outcomes is expressed through a set of threshold parameters. The thresholds $\tau_1, \tau_2, \ldots, \tau_{k-1}$ partition the latent variable Y^* into k categories. Specifically, the observed outcome is defined using the following piecewise function:

$$Y = \begin{cases} 1 & \text{if } Y^* \leq \tau_1 \\ 2 & \text{if } \tau_1 < Y^* \leq \tau_2 \\ \vdots & \vdots \\ k & \text{if } Y^* > \tau_{k-1} \end{cases}$$

This structure allows to model the probabilities associated with each category of the ordinal outcome. The ordered probit model estimates the coefficients λ and using maximum likelihood estimation, which involves calculating the likelihood of observing the data given the estimated parameters. For standard probit estimations we display the average marginal effects in the regression tables. These measure how a one-unit change in the dependent variable Z_j affects the probability of the dependent variable Y being equal to 1. Mathematically, the marginal effect can be expressed as:

$$\frac{\partial P(Y = 1 \mid \mathbf{Z})}{\partial Z_j} = \phi(\mathbf{Z}\beta) \cdot \beta_j,$$

where ϕ is the probability density function of the standard normal distribution, $\mathbf{Z}\beta$ is the linear predictor, and β_j is the coefficient associated with the independent variable Z_j. Likewise, in the case of ordered probit, we can calculate marginal effects for each category of the ordinal outcome. These measure the change in the probability of Y being in a particular category with respect to a one-unit change in an independent variable Z_j. Since the marginal effects per category of the ordinal variables would inflate the regression output immensely, we only report the estimated coefficients.

The F-statistic was instrumental in assessing model performance and is presented at the bottom of the regression tables. A significant F-statistic implies that the model explains a statistically significant portion of the variance in the dependent variable. Finally, the proportion of cases where the outcomes predicted by the model match those actually observed provides a straightforward measure of the overall quality of fit of our (ordered) probit estimates (Greene and Hensher, 2010, p. 49ff). A higher fraction suggests that the model is effectively discriminating between different categories of outcomes. Overall, the models perform reasonably well, with the proportion of classes correctly predicted ranging from 38.2% to 62.4% for ordered probit regressions (with up to 5 categories) and from 65.5% to 86.1% for binary probit estimates.[17]

The opportunity to develop a new enterprise survey specifically for the purpose of this analysis was instrumental in providing a fairly broad and comprehensive set of control variables to be used in each estimation. Nevertheless, potential problems of unobserved heterogeneity with regard to the estimated coefficients, thresholds, or in the variance and distribution of the error term (Greene et al. 2014) can significantly affect the results. To address unobserved heterogeneity, more complex models than those used here are required, such as varying coefficient models, latent class analysis or random effects models are required.[18] We therefore want to stress that all the regressions are strictly descriptive in the sense of depicting significant conditional correlations. The mere scope of the current analysis renders a valid account of unobserved heterogeneity together with structural modelling of proper causal relationships infeasible. They shall be sought in future work on more narrowly defined segments of the data.

[17]In regressions using the svy (survey design) option, Stata does not enable 'predict'. Therefore, when examining the 'observed versus predicted' outcomes, we had to run the regressions without weighting the companies in our sample.

[18]See Lin et al. 2015, Campbell et al. (2011), Lanza and Rhoades (2013) or Fountas et al. (2021).

4 Most important platform

This section presents a first set of equations, where we examine the major factors that associate with the participation in what the firms consider to be their most important online platform. These factors can differ greatly by the particular area of business activity to which they apply. Moreover, we must expect that the different areas of use may significantly relate to the other dependent variables, to which we will turn in the later sections. Briefly investigating the firms' characteristics, motives and obstacles of platform participation should therefore also provide a firmer foundation for the interpretation of the results in the subsequent sections.

Model and hypotheses

The directed graph in Figure 2 summarises the statistical associations that we test in this section. The firm's *main platform* can be in either of p different fields of business activity: (i) sales, (ii) procurement, (iii) production, (iv) logistics, (v) human resources (HR), (vi) information (business intelligence), or (vii) communication. For our sample of firms i these constitute the vector of dependent variables P_i^p. The econometric model further comprises x different control variables together with m motives for and b barriers of adoption in order to estimate the probability that firm i considers the most important online platform (P) it uses to be in either of the p different areas. In our preferred specification, we apply a series of probit estimations with sample weights (*svy* option in Stata) to test the following set of potential relationships:

$$P_i^p = \alpha_p + \gamma_p^m M_i^m + \delta_p^b B_i^b + \beta_p^x X_i^x + \epsilon_i^p \tag{1}$$

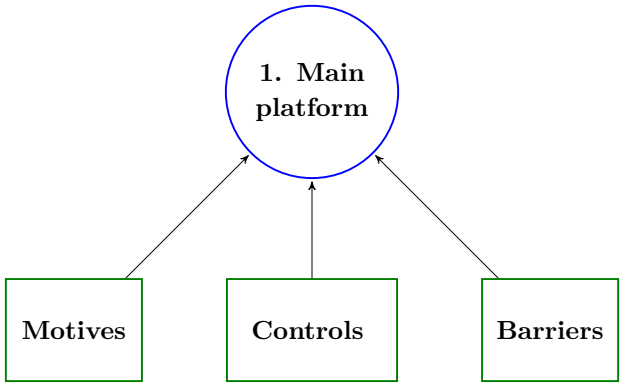
Empirical results

As platforms can serve different purposes, companies were allowed to select more than one business domain in which they use their most important online platform.[19] The most common use has been in communications (54.7%) and information (41.7%), followed by HR (37.1%) and sales (28.4%). More specific and much rarer is the use in the areas of procurement (10.6%), logistics (6.9%) and production (4.8%). Only a few companies chose the remaining category of 'other' purposes (1.7%).[20]

[19]Of the companies that took part in the enterprise survey, only 11.9% explicitly stated that they do not use online platforms. However, this figure is difficult to interpret. On the one hand, there is reason to believe that companies that do not use online platforms are less likely to participate in the survey (non-response bias). In this case, the resulting adoption rate of 88.1% of companies that use at least one online platform represents an upper bound (see Section 3). On the other hand, there may be companies that use online platforms without recognising them as such, despite our explanations in the survey and the invitation letter. Consequently, our results are indicative only of the subjective assessment of the companies surveyed.

[20]The five online platforms per business domain that were most frequently reported by the firms are (i) *Sales*: Booking, Willhaben, Amazon, Facebook and Expedia; (ii) *Procurement*: Amazon, eBay,

Figure 2: Motives and barriers for adopting the most important online platform



Note: The exogenous variables are framed in rectangles, the explained variables within circles. The color of the outline refers to different levels of analysis: (i) green: general control variables, (ii) blue: market characteristics.

Table 7 in the Annex displays the marginal effects, that is the change in the probability of adopting the main platform given a unit change of the explanatory factor. The results confirm the general relevance of each of the three groups of explanatory variables while demonstrating considerable heterogeneity in terms of their association with the adoption of the main platform in the distinct areas of corporate activity. Among the general *control* variables, geographic location plays a negligible role in the case of Austria. In contrast, there are significant sectoral differences. For instance, when compared to the group of non-financial market services, firms in the construction sector are significantly more likely to use online platforms in the areas of production, HR, and business intelligence, whereas firms in the tourism sector show by far the highest probability to do so in the area of sales. The estimates also show modest but significant positive marginal effects in the areas of sales, production and HR for particularly ICT-intensive industries. Industries characterised by a high share of 'creative entrepreneurship' associate positively with the probability of adoption in the field of HR, but negatively in sales and logistics.[21] With regard to the other control variables, being part of an enterprise group raises the probability of adoption in sales and HR, but reduces it in procurement. Older firms are more likely to adopt their main platform in sales and production, but less so in HR. The probability of adoption rises markedly with firm size in HR, and to a lesser degree also in production and logistics. Exporting firms are more likely to use their main online platform in logistics. Finally, better access to broadband connections associates with positive marginal effects in sales and procurement, while the self-reported degree of digitization does so in sales and logistics.

Booking, shöpping.at, Geizhals; (iii) *Production (incl. logistics, RTD)*: MS Azure, SAP, Timocom, Transporeon, aws; (iv) *HR*: karriere.at, AMS, LinkedIn, XING, Facebook; (v) *Information & communication*: Facebook, Instagram, LinkedIn, Google and YouTube.

[21] See Peneder (2010, 2020) for a documentation and validation of these sectoral taxonomies.

The *motive* of establishing a new business model associates positively with the use of online platforms in procurement and communication, while growth objectives do so for information and communication. Efficiency matters most in production. Similarly, quality improvements associate with a higher adoption rate in production, but also in logistics and communication. The motive of increasing variety and flexibility matters most in HR. Enhancing visibility and reach associates positively with the use of online platforms with regard to information and communication. So does the purpose of enhancing customer loyalty, which also associates positively with their use in sales and HR. Finally, technical requirements for compatibility matter most in production.

Among potential *barriers* to use their main platform more (often), firms are significantly more likely to consider their opportunities already exhausted in the fields of HR, information or communication, and significantly less so in sales or production. In production, firms are less likely to know too little about the platforms. In contrast, firms complain significantly more about high implementation costs in the areas of sales or production. Cost considerations matter most in procurement, labour skills in information and communication. Fear of dependency from the platform owner hardly differs between the fields of activity, whereas data security and protection matter most in production and logistics. Concerns about the strategic use of data are highest in procurement and for gathering information.

5 Competition

In this section, we aim to better understand the nature and intensity of competition between online platforms as perceived by the companies using them. For example, we want to investigate whether the ease of switching online platforms and their competitive behaviour differs according to the respective areas of corporate activity. This should also improve our understanding of the role of platform competition for the subsequent analysis of the impacts, satisfaction and willingness to pay when using online platforms. While the subjective nature of the data is a general caveat of surveys, the fact that it captures the intensity of competition as perceived by the firms concerned is an advantage that is often overlooked in applied empirical analysis. In the context of our investigation, we see this as a benefit because it avoids the much larger problem of defining valid (sub)markets and precise boundaries between individual platforms.

Model and hypotheses

We apply the ordered probit model to estimate five equations with the following answers from the enterprise survey constituting our vector of dependent variables C_i^c:

- *Substitutability*: How difficult do you currently think it is to switch to another platform? (i) Very easy, (ii) rather easy, (iii) rather difficult, or (iv) very difficult.
- *Switching between platforms*: Have you already switched platforms at least once? (i) Yes, or (ii) no.

– *Terms of use – clarity*: The terms of use of the online platform most relevant to your organisation and any documents interpreting them are (i) very clear, (ii) rather clear, (iii) rather unclear, (iv) very unclear, or (v) don't know.

– *Terms of use – implementation*: The terms of use and their implementation by the operator are (i) very much or (ii) rather in favour of the operator, (iii) balanced, (iv) rather or (v) very much in favour of your company, or (vi) don't know.

– *Terms of use – negotiability*: Did your company have the opportunity to negotiate and customise individual contractual terms of its most important online platform? (i) Yes, was also used; (ii) yes, but was not used; (iii) no; or (iv) don't know.

The set of independent variables consists of the control variables X, selected barriers of adoption B that may potentially relate to platform competition and the distinct business domains P, where the most important platform is used. In addition, we include variables that indicate d exogenous elements of market structure D. These include the perceived number of competing platforms and various potential barriers to switch between them:[22]

$$C_i^c = \alpha_c + \rho_c^d D_i^d + \eta_c^p P_i^p + \delta_c^b B_i^b + \beta_c^x X_i^x + \epsilon_i^c \tag{2}$$

Figure 3 summarizes the heuristic model for which we expect the following statistical associations:

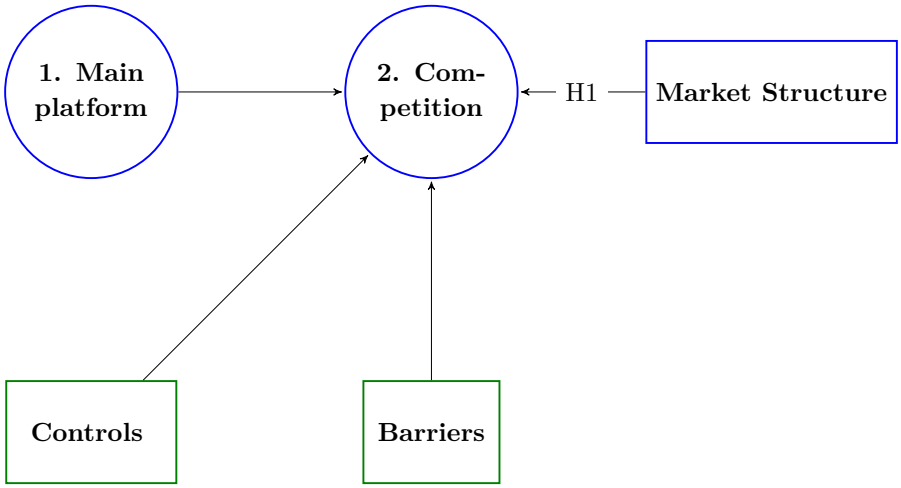
H1: The intensity of **platform competition** (C) tends to increase with the number of rival online platforms and to decrease with the relative importance of potential barriers to switching between them.

Empirical results

To start with some basic descriptive statistics, 10.7% of the managers think it is very easy, and 46.8% think it is easy to substitute their most important online platform with an alternative provider, if desired. Conversely, 32.0% of them respond that it is difficult and 10.4% that it is very difficult. Only 25.8% of companies have switched providers at least once. A majority considers the terms of use to be clearly (48.5%) or even very clearly (19.3%) worded and implemented favourably (42.3%) or very favourably (2.9%) for the customer. Nevertheless, a significant proportion of business users consider their implementation to be unfavourable (27.9%) or even very unfavourable (8.7%), while the rest does not know. In most cases, the terms of use are non-negotiable (59.0%). While many managers do not know (21.6%) and some think they might but have never negotiated (6.4%), around 13.1% of managers state that their organisation has actually exercised the option to negotiate them.

[22]These include, for example, the lack of competing platforms; available platforms being either too small, too expensive or of poorer quality; language barriers; data security; data portability or the fear of losing business partners.

Figure 3: Competition among online platforms



Note: Exogenous variables are framed in rectangles, the explained variables within circles. The color of the outline refers to different levels of analysis: (i) green: general control variables, (ii) blue: market characteristics. *H* stands for general hypothesis.

Turning to the regression analyses, Table 3 displays the coefficients from the ordered probit estimations. These show only few significant associations with regard to the general control variables. For example, firms that consider themselves relatively advanced in terms of digitalization more often report that the terms of use were implemented in a favourable manner and (in part) negotiable. The latter also applies to exporting firms. Companies that blame their lack of technical infrastructure as a *barrier* to use the online platform tend to be more sceptical about the ease to opt for an alternative provider and are less likely to have ever done so. The same applies to firms that are concerned about data security or loosing core competences to the platform.

There are also pronounced differences in online platform competition between the distinct domains of use. Firms using them in the area of sales exhibit a higher propensity to have switched platforms in the past and assess the clarity and negotiability of the terms of use more favourably. Firms using their most important online platform in production are more likely to have already switched between alternative providers. Using it in logistics associates with a better average assessment of the clarity and negotiability of the terms of use. Switching platforms tends to be easier in the area of HR, where firms are also more likely to have done so in the past. The opposite applies to firms that use them for communication.

Table 3: Competition between online platforms

VARIABLES	Changing platform		Terms of use ...		
	Easy	*Done*	*Clarity*	*Applied*	*Negotiable*
Rival platforms	0.206***	0.234***	0.124***	-0.0126	0.139***
	(0.0490)	(0.0572)	(0.0453)	(0.0466)	(0.0508)
Rivals in 3 years	0.379***	0.320***	0.156*	0.0886	0.00494
	(0.0922)	(0.113)	(0.0844)	(0.0809)	(0.0909)
D1 Not available	-0.335***	-0.314*	-0.141	-0.181	-0.364**
	(0.129)	(0.172)	(0.133)	(0.128)	(0.149)
D2 Too small	-0.536***	-0.394**	-0.363***	-0.383***	-0.669***
	(0.125)	(0.181)	(0.138)	(0.147)	(0.161)
D3 Too expensive	0.0461	0.00218	0.0565	0.0902	0.244
	(0.159)	(0.207)	(0.153)	(0.161)	(0.167)
D4 Language barrier	-0.207	-0.498	-0.575*	-0.102	-0.321
	(0.303)	(0.441)	(0.339)	(0.349)	(0.432)
D5 Data concerns	0.0556	-0.0174	-0.105	0.190	-0.101
	(0.167)	(0.221)	(0.169)	(0.190)	(0.183)
D6 Poor quality	0.0740	0.116	0.261**	0.230*	-0.143
	(0.113)	(0.158)	(0.131)	(0.128)	(0.141)
D7 Adjustment cost	-0.513***	-0.0807	-0.0485	-0.00808	0.174
	(0.133)	(0.166)	(0.138)	(0.142)	(0.152)
D8 Portability	-0.381**	0.0568	0.000774	0.395*	0.0134
	(0.167)	(0.207)	(0.166)	(0.202)	(0.190)
D9 Business partner	-0.186	-0.123	-0.0641	-0.309**	-0.0157
	(0.147)	(0.174)	(0.128)	(0.128)	(0.172)
D10 No difficulty	0.555***	-0.303	0.203	0.253*	0.00481
	(0.145)	(0.188)	(0.147)	(0.132)	(0.154)
D11 Other	-0.488	-5.660***	0.205	-0.137	-1.792***
	(0.368)	(0.225)	(0.266)	(0.366)	(0.522)
P1 Sales	-0.00597	0.280*	0.242**	-0.103	0.500***
	(0.122)	(0.153)	(0.115)	(0.113)	(0.134)
P2 Procurement	-0.143	-0.184	-0.233	0.0588	-0.109
	(0.158)	(0.200)	(0.164)	(0.160)	(0.188)
P3 Production	-0.0957	0.521*	0.253	-0.0525	0.305
	(0.243)	(0.270)	(0.271)	(0.232)	(0.254)
P4 Logistics	-0.0746	0.122	0.405**	-0.127	0.518**
	(0.193)	(0.226)	(0.163)	(0.198)	(0.201)
P5 HR	0.332***	0.442***	0.0145	0.134	-0.107
	(0.110)	(0.136)	(0.0994)	(0.0955)	(0.111)
P6 Information	-0.111	0.0947	-0.0466	-0.190**	-0.100
	(0.111)	(0.144)	(0.0981)	(0.0962)	(0.116)

Table 3: Competition between online platforms ctd.

VARIABLES	**Changing platform**		**Terms of use ...**		
	Easy	*Done*	*Clarity*	*Applied*	*Negotiable*
P7 Communication	-0.0301	-0.245*	-0.0798	-0.0932	0.0468
	(0.105)	(0.147)	(0.100)	(0.100)	(0.121)
P8 Other	-0.746**	0.389	0.844***	0.300	-0.0934
	(0.311)	(0.367)	(0.283)	(0.288)	(0.456)
B7 Tech. infrastruct.	-0.641**	-0.894**	-0.496	-0.0199	-0.364
	(0.282)	(0.408)	(0.354)	(0.422)	(0.358)
B8 Complexity	0.221	0.271	-0.184	0.157	0.174
	(0.147)	(0.240)	(0.156)	(0.177)	(0.216)
B11 Core competence	-0.485	-1.186**	0.569*	-0.00709	0.314
	(0.497)	(0.548)	(0.331)	(0.299)	(0.412)
B12 Dependency	0.0121	0.371	0.192	-0.314	-0.449
	(0.319)	(0.354)	(0.222)	(0.302)	(0.307)
B13 Data concern	-0.305*	-0.723*	-0.268	0.00645	-0.178
	(0.166)	(0.380)	(0.241)	(0.241)	(0.234)
Manufacturing	-0.0441	-0.163	-0.0421	-0.0962	-0.171
	(0.155)	(0.206)	(0.155)	(0.150)	(0.166)
Construction	0.0541	-0.221	0.0141	0.346*	0.282
	(0.206)	(0.260)	(0.179)	(0.185)	(0.190)
Tourism	-0.216	0.0786	0.157	-0.143	0.230
	(0.186)	(0.254)	(0.174)	(0.189)	(0.207)
ICType3	-0.0556	-0.0344	0.149***	-0.00401	0.0447
	(0.0595)	(0.0734)	(0.0552)	(0.0541)	(0.0626)
EnType==3	0.211*	0.0766	-0.268**	-0.125	-0.0168
	(0.121)	(0.158)	(0.121)	(0.104)	(0.131)
Enterprise group	-0.0448	0.171	0.132	0.0139	0.0677
	(0.106)	(0.135)	(0.0986)	(0.105)	(0.117)
Age (ln)	0.0639	-0.179**	-0.0664	0.103*	-0.104
	(0.0539)	(0.0703)	(0.0587)	(0.0564)	(0.0669)
Firm size: med	-0.317***	-0.0592	0.144	-0.0132	0.0392
	(0.117)	(0.166)	(0.116)	(0.118)	(0.128)
Firm size: large	-0.173	-0.0846	0.183	0.0392	0.503***
	(0.137)	(0.191)	(0.148)	(0.144)	(0.158)
Sales growth	0.0530	-0.287**	-0.0983	-0.0846	-0.0367
	(0.0617)	(0.138)	(0.0755)	(0.0634)	(0.102)
Job growth	-0.303*	-0.182	0.128	-0.0203	-0.545***
	(0.178)	(0.185)	(0.189)	(0.216)	(0.192)
Past demand	0.0433	-0.0810	-0.0160	0.0372	0.0320

Table 3: Competition between online platforms ctd.

VARIABLES	**Changing platform**		**Terms of use ...**		
	Easy	*Done*	*Clarity*	*Applied*	*Negotiable*
	(0.0569)	(0.0701)	(0.0548)	(0.0620)	(0.0666)
Future demand	0.0741	0.245***	0.110	-0.0715	0.0884
	(0.0749)	(0.0903)	(0.0714)	(0.0709)	(0.0786)
RTD	0.0119	0.204	-0.112	0.0150	-0.0836
	(0.109)	(0.142)	(0.110)	(0.100)	(0.123)
Exports	0.00522	0.0647	-0.237**	-0.120	0.261**
	(0.120)	(0.142)	(0.112)	(0.108)	(0.127)
Broadband	0.0656	0.0323	0.0145	-0.0447	-0.0892**
	(0.0415)	(0.0497)	(0.0401)	(0.0372)	(0.0416)
Digitization	-0.0755	0.0987	0.0665	0.106*	0.139**
	(0.0643)	(0.0790)	(0.0555)	(0.0613)	(0.0641)
F, Prob > F	6.06***	35.59***	3.28***	2.19***	3.44***
Observations	816	816	818	816	819
Correct predictions, %	52.83	72.37	47.95	43.51	56.16

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
NB: (i) Neither significant nor displayed: B6, B8, B10 and B11.
(ii) Predictions based on total sample ??
Source: WIFO survey and calculations.

Finally, the results support our main conjecture (H.1): A larger number of *rival platforms* and their expected increase over the next three years shows a highly significant and positive conditional correlation with the ease of switching between online platforms, the probability of already having done so as well as the clarity of the terms of use. Firms reporting a higher number of rival platforms also more favourably assess the negotiability of the terms of use (although we find no significant association with respect to their implementation). Among the potential *barriers to switch* the online platform, rival platforms being considered to be too small is the barrier with the most consistent negative association. Similarly, concerns about high adjustment costs and data portability associate with a significantly lesser ease of changing the platform. Finally, the fact that the perceived poorer quality of competing platforms is significantly related to a better rating of the clarity and implementation of the terms of use suggests that good competitive behaviour of the online platform is an effective barrier to switching to other providers.

To conclude, the microdata from the enterprise survey strongly confirm a significant conditional correlation between market structure and competition among online platforms as perceived by its business users (H.1).

6 Impacts

In this section, we turn to the impacts of using the most important online platform as perceived by the firms that participated in the enterprise survey. In addition to their general association with the various control variables, business domains, motives and barriers to use, we are specifically interested in the conditional correlation of the impacts with the indicators of platform competition and whether firms pay fees.

Model and hypotheses

We use ordered probit estimations to investigate the conditional correlation of n dependent variables that measure either of two general types of impacts I as perceived by the companies themselves:

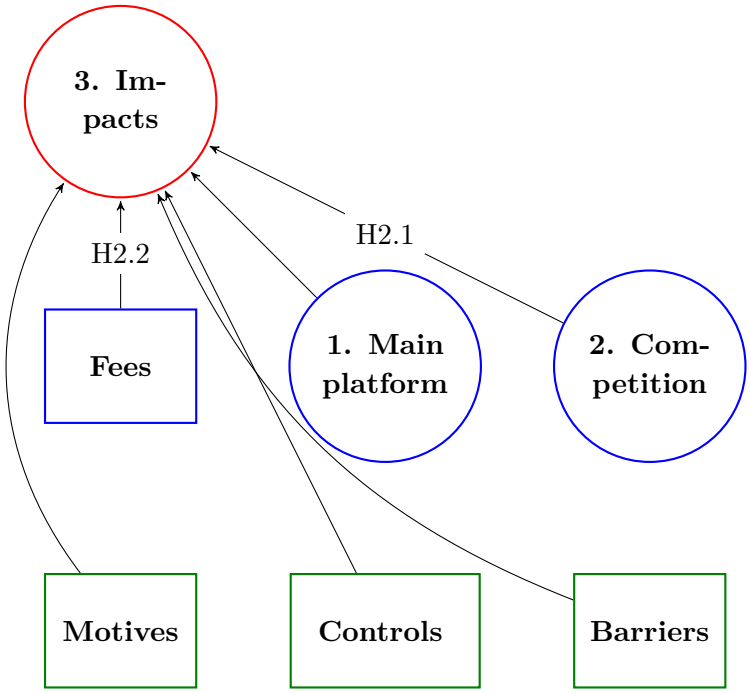
- *Sales-enhancing* effects on (i) sales growth in general, the number of (ii) business partners and (iii) customers, (iv) the sales per customer, (v) selling prices, (vi) the quality and (vii) variety of goods and services.
- *Cost reducing* effects in (i) general, and with regard to (ii) labour costs, (iii) recruiting, (iv) investments, (v) intermediate inputs, (vi) administration, (vii) business intelligence, or (viii) other.

The set of independent variables includes a dummy variable F, telling whether fees are paid for the use of the online platform, the different business domains where the most important platform P is used, indicators of competition between the online platforms C, the motives M and barriers B to adoption together with the control variables X:

$$I_i^n = \alpha_n + \phi_n F_i + \eta_n^p P_i^p + \kappa_n^c C_i^c + \delta_n^m M_i^m + \delta_n^b B_i^b + \beta_n^x X_i^x + \epsilon_i^n \tag{3}$$

Figure 4 summarizes the heuristic model for which we test two general preconceptions. First, we expect that greater competition C between online platforms tends to make the services more attractive to the business users as reflected in their better rating of the impacts. Second, when companies are willing to pay a fee F for the platform service, this should also correlate with better rated impacts of its use. We expect this to hold in particular with regard to the sales-enhancing effects, but not necessarily for the cost-related impacts, since the fees themselves represent additional costs:

Figure 4: Impact of using online platforms



Note: The exogenous variables are framed in rectangles, the explained variables within circles. The color of the outline refers to different levels of analysis: (i) green: general control variables, (ii) blue: market characteristics, (iii) red: outcomes. *H* stands for general hypothesis.

H2.1: More **competition** between platforms (C) associates with better services and correspondingly better impacts, as perceived by their users, in terms of (a) increasing sales and (b) reducing costs.

H2.2: If companies **pay fees** (F) to use the platform, we expect that they will tend to experience higher sales-enhancing effects as a result of using it.

Empirical results

In the enterprise survey, we asked managers to rate potential impacts of the use of online platforms on a five-point Likert scale. Regarding the overall impact, we asked: *Does the use of online platforms tend to increase or decrease your company's overall revenue?* Of the 875 responding companies, 36.6% replied that overall sales had increased and 5.3% said that they had grown a lot as a result of using the platform. Only 2.1% replied that sales had decreased (either moderately or significantly). Most companies (56.0%) reported no significant impact on overall sales. With regard to specific impact channels, 36.1% and 55.9% of companies reported a positive or very positive effect on the number of business partners and customers respectively. The corresponding proportions for turnover per customer were 20.0% and 13.2% for sales prices, 21.0% for

increased quality and 32.1% for increased variety of services and products.

When we asked the same question about the *impact on total costs*, again a majority of companies (57.0%) reported no significant effects. However, more companies reported either a modest or large increase in total costs (29.7%, 1.0%) than a modest or large reduction (11.7%, 0.6%). Looking at different cost categories, 28.1% of companies reported that investment expenditures had increased or increased very much. The corresponding shares are 25.2% for spending on intermediate goods and services, 43.3% for administration, 26.6% for information and 18.3% for labour costs. Recruitment was the only category where more firms reported a cost-reducing effect of using the online platform than a cost-increasing effect, at 30.5% versus 20.9%.

Turning to the analysis of conditional correlations with the firms' perceived impact of using their main platform, Table 4 presents the coefficients from the ordered probit estimates for sales-related effects, while Table 8 in the Annex exhibits those for the cost-related effects. While both tables provide a comprehensive picture, we will only discuss a few selected examples here. In short, conditional on the set of covariates used in the regression, a higher number of rival platforms correlates positively with a significantly greater impact of their use on the number of business partners, sales per customer and the variety of products offered by the enterprise. Companies which state that they have changed their platform in the past report significantly higher positive effects of their use on the quality of their services and products. However, the estimates do not show any significant differences in terms of cost-related effects. We find significant positive conditional correlations between firms that *pay fees* for their main online platform and their perceived impact on the number of business partners as well as on the number of customers, revenue per customer and total revenue growth. But paying fees associates with higher overall costs, such as expenditure on investments and on intermediate goods. If we look to the general *control variables*, large firms, for example, report significantly lower cost-increasing effects of using the platform than small firms. With respect to the *barriers* of using the platform, firms that see the need for personal contact as an important obstacle to the (more intensive) use of the platform also report a significantly lower impact on sales growth in general and on the number of customers and sales prices in particular. Conversely, companies that fear increasing competition due to the platform report a significantly higher impact of its use on revenue per customer or on the quality of products and services. As regards the *motives* for platform adoption, the aim to establish a new business model comes with higher positive effects on the quality and variety of the products and services offered, but also with lower effects on sales prices. Finally, many companies seem to thrive on the motive of increasing operational efficiency, as they also report significantly more negative effects on overall costs as well as on the costs of recruitment, inputs, administration or obtaining information.

Table 4: Perceived sales enhancing impact of platform used

VARIABLES	Sales growth	Number of partners	Number of customers	Sales per customer	Selling price	Increase of Quality	Increase of Variety
Paying fees	0.161**	0.302***	0.125**	0.132**	0.0930	0.0516	0.0861
	(0.0677)	(0.0613)	(0.0600)	(0.0668)	(0.0738)	(0.0718)	(0.0696)
P1 Sales	0.608***	0.306**	0.613***	0.221	0.0358	0.0662	0.325**
	(0.135)	(0.139)	(0.131)	(0.142)	(0.152)	(0.139)	(0.141)
P3 Production	-0.194	-0.455**	-0.339	0.106	-0.479*	0.341	0.292
	(0.257)	(0.231)	(0.264)	(0.260)	(0.259)	(0.291)	(0.312)
P5 HR	-0.165	0.0303	-0.183	-0.224*	-0.150	-0.233*	-0.274**
	(0.127)	(0.122)	(0.115)	(0.127)	(0.124)	(0.122)	(0.125)
P7 Communication	0.161	0.0787	0.291**	0.279*	0.0355	-0.0542	0.241
	(0.136)	(0.145)	(0.139)	(0.148)	(0.145)	(0.142)	(0.150)
P8 Other	0.586	-0.0728	0.495	-0.471**	0.578*	0.0440	0.276
	(0.543)	(0.487)	(0.396)	(0.224)	(0.326)	(0.334)	(0.447)
Rival platforms	-0.00187	0.152***	0.0835	0.170***	-0.00248	0.0780	0.0944*
	(0.0539)	(0.0583)	(0.0531)	(0.0529)	(0.0578)	(0.0550)	(0.0555)
Changed platform	0.0727	-0.152	-0.0399	0.0654	0.0775	0.383***	0.175
	(0.124)	(0.150)	(0.135)	(0.146)	(0.149)	(0.139)	(0.133)
M1 New business model	0.00711	0.214	0.188	0.0147	-0.312*	0.317*	0.329**
	(0.141)	(0.153)	(0.142)	(0.158)	(0.167)	(0.163)	(0.154)
M2 Growth	0.200	0.318**	0.101	-0.0732	-0.148	-0.0612	0.0331
	(0.146)	(0.147)	(0.134)	(0.134)	(0.128)	(0.123)	(0.142)
M3 Efficiency	0.286**	0.0349	0.0708	0.145	0.0704	0.120	0.150
	(0.120)	(0.131)	(0.119)	(0.116)	(0.120)	(0.123)	(0.126)
M5 Variety/flexibility	-0.0260	0.288**	-0.0737	0.173	-0.0176	0.160	0.230
	(0.153)	(0.135)	(0.127)	(0.151)	(0.152)	(0.152)	(0.147)
M6 Visibility/reach	0.248*	0.244*	0.207	-0.171	-0.0365	-0.0296	0.00706
	(0.146)	(0.140)	(0.136)	(0.136)	(0.136)	(0.137)	(0.145)
M7 Customer loyalty	0.136	0.234	0.177	0.210	0.382**	0.366***	0.166

Table 4: Perceived sales enhancing impact of platform used ctd.

VARIABLES	**Sales growth**	**Number of partners**	**customers**	**Sales per customer**	**Selling price**	**Increase of Quality**	**Variety**
	(0.132)	(0.149)	(0.131)	(0.151)	(0.154)	(0.139)	(0.137)
B3 Not known (enough)	0.0301	-0.108	0.0508	-0.242	-0.429**	-0.456***	0.472**
	(0.281)	(0.195)	(0.179)	(0.202)	(0.188)	(0.172)	(0.226)
B4 Implementation costs	-0.768***	0.666**	0.114	-0.355	-0.867***	-0.298	0.204
	(0.287)	(0.339)	(0.289)	(0.275)	(0.310)	(0.303)	(0.268)
B5 Variable costs	0.356*	-0.461**	0.406**	0.429**	-0.117	-0.0552	0.0332
	(0.211)	(0.210)	(0.189)	(0.195)	(0.225)	(0.218)	(0.233)
B6 Personal contact	-0.316**	-0.113	-0.275*	-0.266**	0.114	0.0484	0.0120
	(0.145)	(0.139)	(0.142)	(0.130)	(0.143)	(0.138)	(0.149)
B7 Tech. infrastructure	-0.379	-0.600*	-0.574*	0.373	0.637	0.753**	0.259
	(0.299)	(0.319)	(0.317)	(0.412)	(0.464)	(0.360)	(0.312)
B8 Complexity	-0.000482	-0.323*	0.0406	-0.513**	-0.231	-0.0682	-0.165
	(0.164)	(0.191)	(0.196)	(0.212)	(0.227)	(0.200)	(0.225)
B9 Labour skills	0.359**	0.144	0.178	0.164	-0.0209	0.261*	0.142
	(0.180)	(0.181)	(0.166)	(0.166)	(0.162)	(0.148)	(0.176)
B10 Rising competition	0.656	0.297	0.264	0.979***	1.007*	1.629***	0.273
	(0.422)	(0.452)	(0.342)	(0.327)	(0.545)	(0.551)	(0.565)
B11 Core competencies	0.352	0.391	-0.129	-0.397	0.375	1.446***	-0.366
	(0.712)	(0.470)	(0.307)	(0.413)	(0.382)	(0.437)	(1.073)
B12 Dependency	0.412*	0.104	0.0867	0.0160	-0.267	-0.340	0.574*
	(0.249)	(0.363)	(0.329)	(0.334)	(0.387)	(0.363)	(0.319)
B13 Data concern	-0.931***	-0.832*	-1.028***	-0.387	0.471*	0.421	-0.580*
	(0.288)	(0.496)	(0.359)	(0.320)	(0.248)	(0.277)	(0.306)
B14 Data strategy	0.134	0.725*	0.646**	0.348	0.0221	-0.429	-0.213
	(0.348)	(0.438)	(0.301)	(0.449)	(0.262)	(0.263)	(0.344)
B15 Other	-0.174	-0.122	-0.527**	-0.162	-0.0605	-0.561	-0.862***
	(0.294)	(0.290)	(0.223)	(0.200)	(0.295)	(0.378)	(0.297)

Table 4: Perceived sales enhancing impact of platform used ctd.

VARIABLES	**Sales growth**	**Number of partners**	**customers**	**Sales per customer**	**Selling price**	**Increase of Quality**	**Variety**
Manufacturing	-0.0215	-0.328*	-0.0474	0.193	0.0604	0.0536	-0.229
	(0.148)	(0.185)	(0.170)	(0.175)	(0.161)	(0.175)	(0.153)
Tourism	0.156	-0.506**	0.552***	0.105	0.649***	0.146	0.135
	(0.227)	(0.242)	(0.203)	(0.199)	(0.214)	(0.194)	(0.210)
ICType3	0.0532	0.0961	0.0633	0.0641	-0.119*	0.0699	0.230***
	(0.0632)	(0.0710)	(0.0652)	(0.0696)	(0.0718)	(0.0732)	(0.0643)
EnType==3	-0.275**	-0.112	-0.240*	0.0310	0.417***	0.211	-0.460***
	(0.132)	(0.137)	(0.123)	(0.140)	(0.138)	(0.150)	(0.138)
Age (ln)	-0.228***	-0.211***	-0.0761	0.0154	-0.0504	-0.00144	0.0416
	(0.0670)	(0.0653)	(0.0674)	(0.0739)	(0.0808)	(0.0640)	(0.0667)
Sales growth 2018-20	0.222***	0.256***	0.214***	0.205**	0.0613	-0.157**	0.0979
	(0.0778)	(0.0724)	(0.0764)	(0.0842)	(0.0932)	(0.0715)	(0.0717)
RTD	-0.0174	0.229*	-0.0995	-0.0912	0.0338	-0.0308	0.0444
	(0.111)	(0.119)	(0.120)	(0.130)	(0.137)	(0.132)	(0.127)
Exports	0.138	0.388***	0.0128	-0.223*	-0.0423	-0.172	-0.0550
	(0.129)	(0.132)	(0.129)	(0.134)	(0.123)	(0.150)	(0.138)
Broadband	-0.0157	-0.0369	-0.0190	-0.108**	0.0653	0.0347	-0.0870*
	(0.0476)	(0.0448)	(0.0425)	(0.0489)	(0.0464)	(0.0466)	(0.0486)
Digitization	0.278***	0.0488	0.151**	0.0625	-0.0817	0.0292	0.0966
	(0.0667)	(0.0759)	(0.0717)	(0.0720)	(0.0791)	(0.0840)	(0.0742)
F, Prob > F	4.14***	3.67***	3.85***	2.95***	1.70***	2.03***	3.31***
Observations	755	714	735	729	709	713	713
Correct predictions, %	57.27	51.50	51.61	62.15	62.38	60.60	54.50

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

NB: Not significant/displayed: P2, P4, M4, M8, M9, M10, south, west, construction, group, size.

Source: WIFO survey and calculations.

7 Satisfaction

In this section, we examine a single equation in which we attempt to identify the main variables that significantly associate with the firms' reported satisfaction of using the services of their most important online platform.

Model and hypotheses

Our dependent variable is the firms' stated satisfaction S with its use of the most important online platform. Among the independent variables that we expect to associate significantly with the satisfaction of business users our main interest is on the various dimensions of the perceived impact of platform use by the same enterprises in the survey. Analysing the variance inflation factors (vif) and dropping variables that showed no or hardly any significant statistical association, we were left with the general impact on the firm's total costs, its number of business partners and customers as well as sales prices. Among the independent variables, we also include the clarity and implementation of the terms of use, which we introduced as indicators relating to the degree of platform competition C, the motives M and barriers B to adoption together with the general control variables X:[23]

$$S_i = \alpha_s + \theta^n N_i^n + \kappa^c C_i^c + \delta^m M_i^m + \delta^b B_i^b + \beta^x X_i^x + \epsilon_i^s \tag{4}$$

Figure 5 summarizes the heuristic model with the following general conjectures:

H3.1 A more favourable perception of the sales-enhancing and cost-related **impacts** of use associates positively with the overall reported satisfaction from participating in the firm's most important online platform.

H3.2 A more favourable perception of the **terms of use**, both with respect to the clarity and their actual implementation, associates positively with the overall reported satisfaction from adopting the firm's most important online platform.

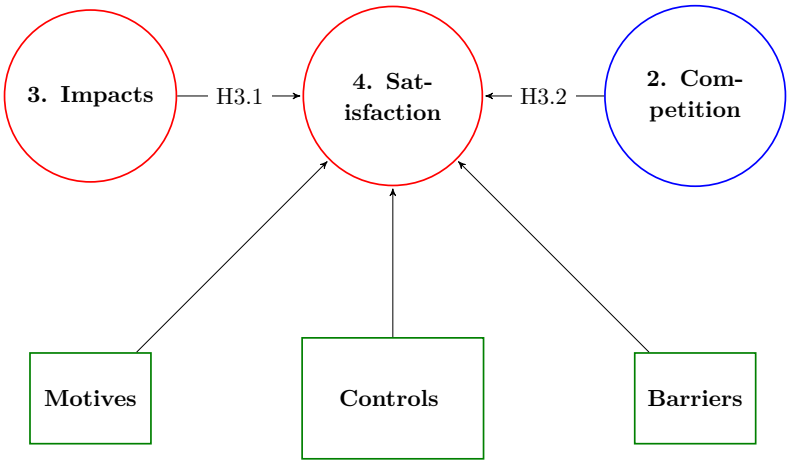
Empirical results

The enterprise survey included the following question, which the managers could rate on a five-point Likert scale: *How satisfied is your company overall with its most important online platform?* The answers were mostly positive. Out of a total of 896 respondents, only 0.5% said they were 'very dissatisfied' and 3.4% said they were 'dissatisfied'. While 25.8% were 'neither', 58.8% of managers were 'satisfied' and 11.4% were "very satisfied".

Different from the previous sections, the focus is now on a single equation. This makes it easier to display the marginal effects of the ordered probit model for each

[23] We have not included the particular business domain of the most important online platform P, or whether firms payed fees F for their service among the independent variables. The former showed only a very low significant pairwise correlation with satisfaction and the latter none at all. Neither exhibited a significant conditional correlation in alternative specifications of the ordered probit estimations.

Figure 5: Satisfaction with using the online platforms



Note: The exogenous variables are framed in rectangles, the explained variables within circles. The color of the outline refers to different levels of analysis: (i) green: general control variables, (ii) blue: market characteristics, (iii) red: outcomes. *H* standy for general hypothesis.

category of possible answers in the regression output (Table 5). The results largely confirm both of the above heuristic conjectures H3.1 and H3.2. More specifically, if firms *ceteris paribus* associate the use of the platform with *higher total costs*, the probability of being satisfied with the platform decreases by 1.5% and the probability of being very satisfied by 2.4%. The relationship is not linear, as the probability of being neither satisfied nor dissatisfied increases on average by 2.9%, while the estimates show no significant effects on the probability of being dissatisfied with the platform.

The estimates show no significant conditional correlation between satisfaction and the perceived impact on the number of customers. In contrast, overall satisfaction with the platform clearly tends to be higher the more positively companies assess its impact on the number of business partners. For example, a more favorable rating by one unit comes with a 2.1% higher probability of being satisfied with the online platform and a 2.8% higher probability of being very satisfied. Similarly, more favorable perceptions of the impact on sales prices correspond with a 2.2% higher probability of being satisfied and a 3.6% higher probability of being very satisfied. If we consider the terms of use as an indicator of pro-competitive or anti-competitive behavior of the online platforms, the companies that perceive them as clearly formulated, transparent and implemented in a customer-friendly manner are also significantly more satisfied with their use. Better ratings of the clarity of the contractual conditions are associated with a 3.7% higher probability of being satisfied and a 6.0% higher probability of being very satisfied. Conversely, the marginal effects on (very) dissatisfied or neither satisfied nor dissatisfied companies are all significant and negative. They are also negative and mostly significant with regard to the actual implementation of the terms of use, while the corresponding probabilities of being satisfied or very satisfied increase by 1.2% and 1.9%.

Table 5: Satisfaction with use of the business platform

Variables	**Coefficient**	**Std dev.**	**Marginal effects ...**				
			Very dissatisfied	*Dissatisfied*	*Neither*	*Satisfied*	*Very satisfied*
Impact Costs	-0.136*	(0.0805)	0.00241	0.00699	0.0293*	-0.0148*	-0.0240*
I1 Customers	0.159	(0.103)	-0.00283	-0.00821	-0.0344	0.0173	0.0281
I3 Business partners	0.193**	(0.0975)	-0.00342	-0.00994*	-0.0417**	0.0210*	0.0341**
I4 Selling price	0.203*	(0.107)	-0.00360	-0.0105*	-0.0439*	0.0221*	0.0359*
Terms: clarity	0.338***	(0.0528)	-0.00600**	-0.0174***	-0.0730***	0.0368***	0.0597***
Terms: implementation	0.108**	(0.0494)	-0.00191	-0.00556*	-0.0233**	0.0117**	0.0190**
M3 Efficiency	0.372***	(0.110)	-0.00659**	-0.0191***	-0.0802***	0.0404***	0.0656***
M7 Customer loyalty	0.358***	(0.122)	-0.00634*	-0.0184***	-0.0772***	0.0389***	0.0631***
B5 Variable costs	-0.482***	(0.156)	0.00855*	0.0248***	0.104***	-0.0524***	-0.0851***
B10 Rising competition	-1.041**	(0.445)	0.0184	0.0536**	0.225**	-0.113**	-0.184**
B11 Core competencies	-1.063**	(0.434)	0.0188*	0.0547**	0.229**	-0.115**	-0.187**
Manufacturing	-0.259*	(0.150)	0.00459	0.0133	0.0559*	-0.0281	-0.0457*
Construction	-0.252	(0.161)	0.00447	0.0130	0.0544	-0.0274	-0.0444
Tourism	-0.139	(0.190)	0.00246	0.00715	0.0300	-0.0151	-0.0245
Enterprise group	-0.269**	(0.114)	0.00477*	0.0139*	0.0581**	-0.0293**	-0.0475**
Firm size: med	0.0920	(0.117)	-0.00163	-0.00474	-0.0199	0.0100	0.0162
Firm size: large	0.353**	(0.141)	-0.00626*	-0.0182**	-0.0762**	0.0384**	0.0623**
Digitization	0.110*	(0.0654)	-0.00196	-0.00569	-0.0238*	0.0120	0.0195*
F, Prob > F:	8.15***						
Observations (N):	740						
Correct predictions, %:	51.94						

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: WIFO survey and calculations.

Finally, the estimates show significant marginal effects on the various control variables. For example, enterprise groups associate with a 2.9% lower probability of being satisfied and a 4.6% lower probability of being very satisfied. Similarly, companies in the manufacturing sector are 4.6% less likely to be very satisfied than those in the sector of market services (excluding tourism). The efficiency motive is associated with a 4.0% higher probability of being satisfied and a 6.6% higher probability of being very satisfied. Among the barriers to adoption, high variable costs and fears of increasing competition or a decline in core competencies due to the platform business model have significant negative marginal effects on the reported satisfaction with their use.

8 Willingness to pay

In this final empirical section, we analyse which factors correlate with companies' willingness to pay for the services of their main online platform if they do not yet have to, or with their willingness to pay more if they already do. Willingness to pay is often used in the literature to reveal preferences for non-market goods (e.g. Ryan et al. 2004; Steigenberger et al. 2022) as well as to assess consumer behaviour and environmental awareness (Boccia at al. 2024, Gomes et al. 2023, Caputo et al., 2013, Evans et al. 2010). We focus on the value of a digital service (as before Kasilingam & Krishna, 2020). In our approach the experimental design is kept very simple. It is covered by a yes/no question, and it is only a small part of the enterprise survey on the business use of online platform. As with the questionnaire in general, there were no incentives given to participate and encourage more replies.[24]

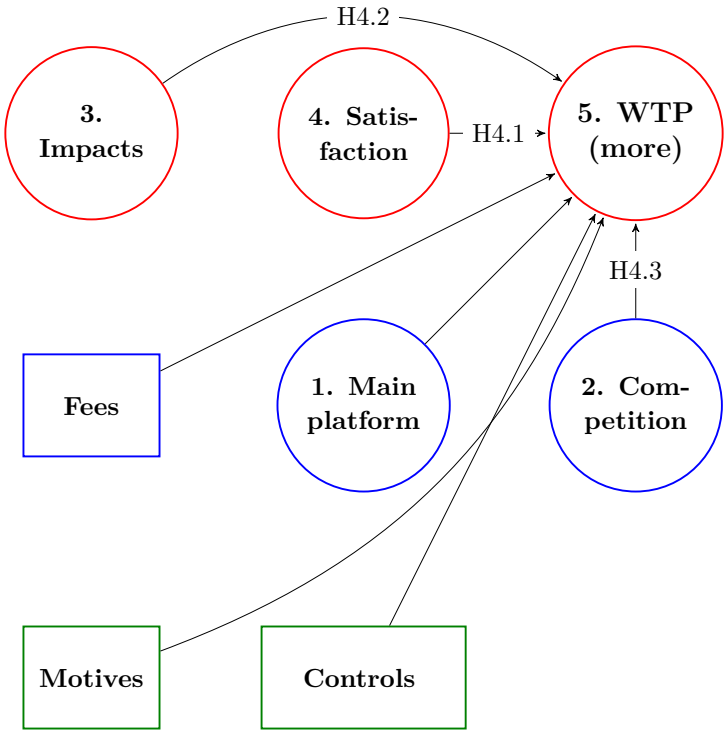
This section is the most ambitious, and at the same time the most exploratory of the analyses reported in this paper. The reason is that companies are in general reluctant to disclose their propensity to spend on the services or may choose to understate their willingness to pay (more). One consequence is that fewer enterprises responded to the corresponding question and we therefore have a lower number of observations to test for significant relationships. Another consequence is that we must interpret the expressed willingness to pay (more) for the online platform services as a lower bound, while for many firms the actual propensity-to-buy may also accord with (higher) fees. We are therefore not aiming for precise numerical values of the dependent variable, but restrict our analysis to the simpler question of whether companies are willing to pay (more) if necessary.

Model and hypotheses

Our dependent variable is the reported willingness to pay WTP (more) for using the company's most important online platform. We add a dummy for whether firms already pay a fee F and their satisfaction S with the use of the platform to the set of independent

[24]There is recent research on how incentives might affect the hypothetical bias (De-Magistris et al. 2021). Unfortunately, any such considerations would have been beyond the scope of our survey.

Figure 6: willingness to pay (more) for the firm's most important online platform



Note: The exogenous variables are framed in rectangles, the explained variables within circles. The color of the outline refers to different levels of analysis: (i) green: general control variables, (ii) blue: market characteristics, (iii) red: outcomes. H stands for general hypothesis.

variables, which also includes the perceived impacts N, indicators on the degree of platform competition C, the different business domains, where the most important platform P is used, the motives for its use M and general control variables X:

$$WTP_i = \alpha_w + \phi_w F_i + \theta^n N_i^n + \kappa^c C_i^c + \delta^m M_i^m + \delta^b B_i^b + \beta^x X_i^x + \epsilon_i^w \tag{5}$$

We summarise the heuristic model in Figure 6. In the following probit estimation, we expect the following statistical relationships to hold for the conditional correlations that we are going to test:

H4.1 The firms' willingness to pay (more) for its most important online platform increases with the degree of **satisfaction** from its use.

H4.2 The firms' willingness to pay (more) for using its most important online platform is higher, when the perceived **impacts** are more favourable to the firm in terms of sales-enhancing and cost-reducing effects.

H4.3 The firms' willingness to pay (more) for its most important online platform decreases with the degree of **platform competition**.

Empirical results

In the enterprise survey, managers could answer the following question with a simple 'yes' or 'no': *Would you be willing to pay a (higher) fee to continue using your main online platform if necessary.* Of the total 829 responses, 34.3% of companies are not charged for using their most important online platform. Of these companies, 77.3% say they are not willing to pay a fee if necessary, while 22.7% say they would. 65.7% of companies already pay a fee. For 57.7% of them, it is less than 1.0%, while 17.3% pay at least 3.0% of their annual sales. Of the companies that are charged fees, 31.9% say they are willing to pay more if necessary, while the others say they would not. Altogether, 28.7% of respondents are prepared in principle to pay (more) for their most important online platform. For the reasons mentioned above, we interpret this as a lower bound.

As in the previous section, we estimate a single equation, and Table 6 shows the marginal effects in addition to the coefficients. In the probit model, we first check whether the companies already pay a fee, which shows no significant conditional correlation with their willingness to pay (more). We take this as an indication that our variable on the firms' declared willingness to pay (more) is not systematically different for those who are or are not already charged a fee. Next, we turn to the heuristic conjectures above. Consistent with H4.1, higher satisfaction with the use of the organization's main online platform associates with a 5.7% higher likelihood of indicating that one would be willing to pay more for it if needed. Similarly, and in line with H4.2a, a better assessment of the sales-enhancing effects of the online platform shows a significant and positive conditional correlation with a marginal effect of 9.6%. The conditional correlation with the perceived impact on total costs is also significant, but here the positive sign of the coefficient is difficult to interpret. In H4.3 we expected a negative conditional correlation between willingness to pay and the intensity of platform competition, reflecting the different degree of dependence of business users on the particular provider of their main online platform. Indeed, the probability of the firm's stated willingness to pay (more) for the service is 4.6% lower when the perceived ease of switching platforms is higher. Conversely, clarity and enforcement of terms and conditions are not significant in this regression (although both were shown to be positively associated with firm satisfaction in the previous section).

Among other control variables, we find, for example, that companies using their main online platform for procurement have a significantly lower willingness to pay (more), with a marginal effect of -19.1%. Similarly, the marginal effects are negative when enterprises cite compatibility (interfaces) as a motive for adopting their main platform (-22.6%) or when they consider themselves to be more advanced in terms of digitalisation than their competitors (−5.0%). Finally, the objective of implementing a new business model (+9.3%) or improving competitiveness (+8.2%), higher demand growth in the past 3 years (+5.7%), being part of an enterprise group (+8.7%), performing own RTD (6.5%) or being an exporting firm (7.9%) are linked to a higher probability of enterprises being willing to pay (more) for the use of their most important online platform.

Table 6: Willingness to pay (more) for using the business platform

VARIABLES	**Coefficient**	**Marginal effect**	**Std dev.**
Already paying fees	-0.0535	-0.0162	(0.0193)
Satisfaction	0.187**	0.0565**	(0.0276)
Impact Sales	0.316***	0.0957***	(0.0349)
Impact Costs	0.184*	0.0556**	(0.0282)
Easy change of PF	-0.151**	-0.0457**	(0.0228)
Terms of use: clarity	-0.0598	-0.0181	(0.0198)
. . . : implementation	0.0760	0.0230	(0.0171)
P1 Sales	0.227	0.0686	(0.0466)
P2 Procurement	-0.632***	-0.191***	(0.0672)
P3 Production	0.252	0.0762	(0.0748)
P4 Logistics	0.393*	0.119*	(0.0700)
P5 HR	0.101	0.0304	(0.0389)
P6 Information	0.0230	0.00696	(0.0404)
P7 Communication	0.120	0.0364	(0.0413)
P8 Other	0.220	0.0667	(0.169)
M1 New business model	0.306*	0.0925*	(0.0476)
M8 Competitiveness	0.272**	0.0823**	(0.0411)
M9 Compatibility	-0.747***	-0.226***	(0.0720)
Enterprise group	0.286**	0.0866**	(0.0400)
Demand growth: past	0.189**	0.0572**	(0.0224)
Demand growth future	-0.115	-0.0347	(0.0289)
RTD	0.216*	0.0654*	(0.0390)
Exports	0.250*	0.0756*	(0.0396)
Digitization	-0.167**	-0.0504**	(0.0244)
F, Prob > F:	3.20***		
Observations (N):	753		
Correct predictions, %:	66.51		

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: WIFO survey and calculations.

9 Summary and conclusions

Online platforms have become a powerful medium of coordination, enabling positive network effects from the digital integration of interdependent but autonomous users through a modular architecture of algorithms and data. They thrive in the complex environment of multi-sided markets, where they may rationally provide services to one group of users for free or below average cost, while making large profits from other groups of users. What may seem like an undisputed value proposition for all participants raises non-trivial questions about the individual benefits of using online platforms. This paper contributes to the literature by opening up the research on online platforms to cross-industry empirical analyses of a large sample of business users. It is based on a stratified sample of 1,380 Austrian firms from a new enterprise survey designed specifically for this purpose. Among other results, the analysis provides ample empirical evidence of the importance and benefits of rivalry between platforms, highlighting the importance of pro-competitive policies and regulation. The following findings are of particular relevance to *business users*, *platform owners* and *public policy*:

- **Digital skills** appear to pay off for business users. Companies which rate themselves as more advanced in terms of digitalisation are also more likely to report that the terms of use have been (partly) negotiable and implemented favourably. In turn, a user-friendly implementation of the terms of use goes together with a significantly higher satisfaction from using the online platform.
- Platform operators can positively differentiate themselves from their rivals by a user-friendly **governance and conduct**. Business users who rate the clarity and implementation of terms of use better are more likely to cite the poor quality of competing providers as an important reason for not switching to other platforms.
- **Effective competition** is key to a healthy ecosystem of online platforms. It eases switching and associates with a higher probability of negotiable and favourable terms of use as well as significantly larger impacts on the number of business partners, revenue per customer or the variety of products offered by the firm. Better impacts for business users go hand in hand with their greater satisfaction, which in turn is linked to a higher willingness to pay (more) for the services.
- In contrast, the ease of switching to an alternative provider correlates with a lower willingness to pay. This indicates that more competition between platforms increases the bargaining power of business users and allows them to claim a **larger share** of the platform's value proposition.

Finally, it should be mentioned that the analysis reveals much **heterogeneity**, for instance with respect to the factors associated with the adoption of an online platform. While such heterogeneity is the norm in everyday business, policymakers need to be aware that one size does not fit all when it comes to regulating online platforms. As a consequence, regulatory design needs to allow for flexibility in addition to the necessary clarity, consistency, and predictability of how new rules will be applied.

The Austrian companies in the current survey generally show a high level of satisfaction with the introduction and use of online platforms, confirming that the majority of them benefit from the platform **value proposition**. The results also show that competition between platforms is a crucial factor, as it conditions the interplay between the adoption of online platforms, their impact and the satisfaction and willingness to pay of users. Given the young age of online platforms and their efforts to grow and move quickly by courting users on both sides of the market, platform competition currently appears to be largely effective for most business customers in our sample. However, one must be concerned that the same network externalities which underpin the platform business model are likely to reinforce a winner-takes-all dynamic as markets mature. If this prevents new competitors from entering and scaling up, it will also impair the wider distribution of the benefits from the platform value proposition.

Public policy has only recently begun to recognise and address the challenges arising from this profound change (Crémer et al., 2019; Furman et al. 2019; Larsson, 2021). The *objective* is to promote a dynamic digital ecosystem in the face of rapidly changing technologies and markets. This requires a dynamic approach to competition policy, capable of preserving the ability of firms to earn a reasonable return on innovation, while preventing the accumulation of uncontestable barriers to entry (Teece, 2023). Among policy *instruments*, mergers and the acquisition of potentially disruptive start-ups by a dominant incumbent need particular scrutiny, as do instances of abuse of a dominant position under antitrust law (Katz, 2019). However, antitrust enforcement tends to be slow and difficult to predict. The fast-moving platform economy thus also warrants regulatory innovation in the form of new rules tailored to specific market conditions and enforceable with predictable outcomes and within a reasonable timeframe. This is particularly relevant for the interoperability of protocol and data portability. Subject to privacy rules, regulation can reinforce their use as nonrival semi-public goods, as opposed to their proprietary and exclusive control becoming effective barriers to multihoming or switching between platforms (Markovich and Yehezkel, 2024).

To meet the challenge of economic and social transformation, law and regulation must co-evolve with technology (Eckardt, 2008). Radical innovation, in particular, requires policy to cope with a high degree of uncertainty about novel business models and behaviours and their likely impact on competition and welfare (Peneder, 2024). Two recent examples illustrate how public authorities try to cope with such radical change. One example is the US *Merger Guidelines* issued in 2023.[25] Directly addressing multisided platforms, Guideline 9 specifies that in applying the general rules, agencies must take into account the 'market realities associated with platform competition.' Among other things, it explicitly points to potential scenarios where the acquisition of firms providing critical services or inputs that facilitate multihoming or switching between platforms poses a threat to competition. Furthermore, Guideline 7 announces to challenge not only acquisitions designed to entrench a firm's dominant position in its own market, but also cross-market acquisitions that may enable it to extend that position

[25]https://www.justice.gov/atr/merger-guidelines. See also Francis (2025).

into another market, for example by tying or bundling different services. Shapiro's (2025) critical discussion illustrates the high uncertainty about actual implementation and likely pitfalls of such regulatory efforts.

The European Union *Digital Markets Act* (DMA),[26] which came into force in 2022, is another example of how policy strives to evolve with changing technology and business models (Eckardt, 2024). The DMA defines *ex ante* rules of conduct for potential gatekeepers who provide a core platform service for business customers to reach end users. For instance, they may not prevent business users from offering the same products or services at different prices or conditions to end users through other online sales channels, including their own. Similarly, gatekeepers may not prevent their business users from independently communicating and promoting offers. The codes of conduct also address issues such as interoperability or data portability, provided that end users agree to the sharing. They also require gatekeepers to enable customers to easily change default settings, uninstall software applications or install third-party software (unless this compromises system integrity) and prohibit any preferential treatment of own products or services over those of a third party participating in the platform.

Given the early stage of implementation, it is currently completely unclear how and to what extent these new policy initiatives will affect the future competitive structure and behaviour of online platforms, or whether new regulations will ever be capable of catching up with their fast-moving target. There is no doubt, however, that a high degree of uncertainty and necessary experimentation with new approaches and policy instruments requires public authorities to scale up appropriate intelligence on the development and functioning of the new online platform ecosystems. Carefully crafted theoretical models and deep and detailed case studies will remain two important pillars in this endeavour. But they won't be sufficient to provide a comprehensive picture of the overall trends, implications and developments in these markets.

By way of example, our survey points to another way of improving the public information and evidence base available for public policy. But the global scale of the challenge demands public initiatives for a comprehensive collection of internationally comparable data, similar to the introduction and establishment of the European Union's Community Innovation Survey (CIS) in the 1990s.[27] To enable future comparative analyses over time and across different economic and legal environments, an internationally harmonised data collection on the business use of online platforms would be an important *institutional innovation*, contributing to the needed co-evolution of society with new technology and markets.

[26] See https://digital-markets-act.ec.europa.eu/index.

[27] Following the example of several national enterprise surveys in the 1980s, EU member states jointly developed and launched the first CIS in 1992. Since then, the CIS has become a regular, biennial survey that collects harmonised data on business innovation with regularly updated methodology and focus topics. While EU policy makers and business leaders have benefited from numerous reports and research findings, access to the anonymised microdata has spawned a vibrant research community on innovation and technological change in Europe.

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Declaration of Interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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10 Annex

10.1 Supplementary tables

– Table 7: Most important platform by area of corporate activity: marginal effects

– Table 8: Perceived cost reducing impacts of platform used

Table 7: Most important platform by area of corporate activity: marginal effects

VARIABLES	**Sales**	**Proc**	**Prod**	**Logi**	**HR**	**Info**	**Comm**
M1 Business model	0.0674	0.0538*	0.0171	0.0178	-0.0118	0.00314	0.142**
	(0.0448)	(0.0321)	(0.0153)	(0.0245)	(0.0520)	(0.0550)	(0.0575)
M2 Growth	-0.0273	-0.0451*	0.0195	-0.0138	-0.0616	0.149***	0.174***
	(0.0379)	(0.0237)	(0.0141)	(0.0153)	(0.0423)	(0.0414)	(0.0370)
M3 Efficiency	0.0431	0.0337	0.0265*	0.0133	0.0345	0.0139	-0.0491
	(0.0377)	(0.0248)	(0.0144)	(0.0167)	(0.0386)	(0.0430)	(0.0378)
M4 Quality	-0.0459	-0.0270	0.0386**	0.0333**	0.0618	0.0677	0.156***
	(0.0392)	(0.0239)	(0.0160)	(0.0157)	(0.0421)	(0.0438)	(0.0392)
M5 Variety	-0.00964	0.0529*	0.0161	0.0126	0.225***	-0.135***	-0.112**
	(0.0417)	(0.0290)	(0.0146)	(0.0184)	(0.0441)	(0.0449)	(0.0437)
M6 Reach	-0.0111	-0.130***	-0.0456***	-0.0711***	0.0449	0.0950**	0.235***
	(0.0388)	(0.0247)	(0.0159)	(0.0177)	(0.0404)	(0.0432)	(0.0356)
M7 Cust. loyalty	0.104**	0.0268	-0.0156	-0.0241	0.106**	0.118***	0.114***
	(0.0411)	(0.0257)	(0.0177)	(0.0192)	(0.0423)	(0.0446)	(0.0413)
M8 Competiveness	-0.00701	0.0374	-0.0114	-0.0171	-0.133***	0.0694	-0.0301
	(0.0408)	(0.0266)	(0.0153)	(0.0192)	(0.0448)	(0.0466)	(0.0419)
M9 Compatibility	0.0597	0.0452	0.0518***	0.0354	-0.137*	-0.177**	-0.209***
	(0.0654)	(0.0434)	(0.0189)	(0.0277)	(0.0697)	(0.0806)	(0.0650)
M10 Other	0.236**	-0.120*	-0.0629*		-0.0233	0.115	0.113
	(0.0960)	(0.0729)	(0.0339)		(0.112)	(0.121)	(0.152)
B2 Options exhausted	-0.112***	0.0268	-0.0341**	0.00724	0.0923**	0.0964**	0.0930**
	(0.0361)	(0.0242)	(0.0152)	(0.0190)	(0.0384)	(0.0405)	(0.0385)
B3 Not known	0.0257	-0.0212	-0.0774**	-0.0160	-0.0481	-0.115	0.0316
	(0.0740)	(0.0466)	(0.0327)	(0.0329)	(0.0720)	(0.0697)	(0.0764)
B4 Implem. cost	0.263***	-0.216**	0.0902***	0.0258	-0.109	-0.213*	-0.160
	(0.0897)	(0.0888)	(0.0267)	(0.0410)	(0.108)	(0.110)	(0.104)

Table 7: Most important platform by area of corporate activity: marginal effects ctd.

VARIABLES	**Sales**	**Proc**	**Prod**	**Logi**	**HR**	**Info**	**Comm**
B5 Variable cost	-0.00809	0.0946**	-0.0565**	0.00211	0.0621	0.0561	0.0515
	(0.0596)	(0.0435)	(0.0223)	(0.0321)	(0.0690)	(0.0719)	(0.0626)
B7 Tech. infrast.	0.00381	0.146**	-0.0355	0.0699	-0.0584	-0.0497	-0.160*
	(0.0887)	(0.0742)	(0.0330)	(0.0461)	(0.105)	(0.113)	(0.0867)
B9 Labour skills	-0.209***	-0.0119	-0.0856***	0.0288	0.00756	0.154**	0.116*
	(0.0596)	(0.0380)	(0.0313)	(0.0251)	(0.0623)	(0.0611)	(0.0623)
B12 Dependency	-0.0652	-0.112	-0.126***	-0.00897	0.0101	0.0386	-0.132
	(0.0782)	(0.0685)	(0.0378)	(0.0595)	(0.0919)	(0.0950)	(0.0832)
B13 Data concern	-0.00669	-0.0137	0.119***	0.0860**	0.0950	-0.138	0.0678
	(0.0895)	(0.0649)	(0.0305)	(0.0407)	(0.0958)	(0.114)	(0.0947)
B14 Data strategy	0.0382	0.133*	-0.0474	-0.0159	0.201	0.444***	0.0914
	(0.104)	(0.0713)	(0.0316)	(0.0633)	(0.124)	(0.150)	(0.126)
B15 Other	-0.0990	-0.0444	0.00799	0.0495	0.167**	0.115	-0.123*
	(0.0788)	(0.0645)	(0.0234)	(0.0309)	(0.0769)	(0.0863)	(0.0741)
South	-0.0259	0.0126	0.0343*	-0.00631	0.0368	-0.0243	0.101**
	(0.0515)	(0.0325)	(0.0204)	(0.0207)	(0.0536)	(0.0541)	(0.0505)
West	0.0193	0.00497	-0.0372**	-0.0202	0.0727*	0.0347	0.0357
	(0.0366)	(0.0250)	(0.0151)	(0.0187)	(0.0384)	(0.0416)	(0.0390)
Manufacturing	0.0217	0.0163	-0.0192	-0.0188	-0.0688	-0.00778	0.0864
	(0.0571)	(0.0373)	(0.0159)	(0.0217)	(0.0542)	(0.0625)	(0.0581)
Construction	-0.188**	-0.0665	0.0769***	-0.0370	0.138**	0.174***	0.0829
	(0.0743)	(0.0474)	(0.0286)	(0.0367)	(0.0681)	(0.0669)	(0.0679)
Tourism	0.234***	-0.0286	0.00808	0.0221	-0.0655	-0.0916	-0.0161
	(0.0573)	(0.0461)	(0.0297)	(0.0305)	(0.0756)	(0.0733)	(0.0684)
ICType3	0.0391*	-0.00617	0.0289***	0.0130	0.0332*	0.00894	0.0313
	(0.0201)	(0.0132)	(0.00837)	(0.00907)	(0.0200)	(0.0221)	(0.0197)
EnType3	-0.166***	-0.0217	0.00141	-0.0729***	0.118***	0.0206	-0.0328

Table 7: Most important platform by area of corporate activity: marginal effects ctd.

VARIABLES	**Sales**	**Proc**	**Prod**	**Logi**	**HR**	**Info**	**Comm**
	(0.0413)	(0.0280)	(0.0138)	(0.0215)	(0.0422)	(0.0467)	(0.0402)
Ent. group	0.0935**	-0.0551**	0.00732	0.00858	0.112***	-0.0205	-0.0240
	(0.0382)	(0.0248)	(0.0138)	(0.0165)	(0.0388)	(0.0401)	(0.0388)
Age (ln)	0.0678***	-0.00638	0.0147*	0.00588	-0.0623***	0.0327	0.00119
	(0.0197)	(0.0118)	(0.00779)	(0.00796)	(0.0202)	(0.0219)	(0.0196)
Size: med	-0.0204	-0.0296	0.0186	0.0252	0.147***	-0.0787*	-0.0556
	(0.0421)	(0.0288)	(0.0166)	(0.0201)	(0.0430)	(0.0464)	(0.0407)
Size: large	-0.0588	0.0447	0.0480***	0.0474**	0.181***	-0.0837	-0.205***
	(0.0520)	(0.0363)	(0.0180)	(0.0209)	(0.0516)	(0.0573)	(0.0533)
Sales growth	-0.0485*	0.00773	0.00137	-0.00618	0.0344	0.0364	-0.0160
	(0.0253)	(0.0137)	(0.0138)	(0.00832)	(0.0346)	(0.0320)	(0.0281)
RTD	0.0462	0.0228	0.0250*	0.00126	0.0357	0.0500	0.0118
	(0.0367)	(0.0250)	(0.0138)	(0.0172)	(0.0399)	(0.0429)	(0.0408)
Exports	-0.0866**	0.0141	0.0156	0.0623***	0.00243	-0.102**	-0.00597
	(0.0420)	(0.0266)	(0.0138)	(0.0204)	(0.0406)	(0.0448)	(0.0409)
Broadband	0.0230*	0.0198*	-0.000105	0.00123	-0.0208	-0.0469***	-0.0214
	(0.0137)	(0.0107)	(0.00539)	(0.00705)	(0.0147)	(0.0153)	(0.0149)
Digitization	0.0365*	-0.0121	0.0140	0.0225**	-0.0343	0.0129	0.00987
	(0.0218)	(0.0152)	(0.00919)	(0.0103)	(0.0219)	(0.0234)	(0.0229)
F, Prob > F	2.90***	2.23***	3.23***	4.62***	3.55***	3.15***	3.68***
Observations (N)	835	815	825	805	835	835	835
Correct predictions, %:	71.48	81.58	86.13	81.69	68.37	65.48	74.14

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
NB: Neither significant nor displayed: B6, B8, B10 and B11
Source: WIFO survey and calculations.

Table 8: Perceived cost reducing impacts of platform used

VARIABLES	General	Labour	Recruiting	Investment	Intermediate	Administration	Information	Other
Paying fees	0.102*	0.00551	0.0424	0.128**	0.119**	0.0466	0.0387	0.100
	(0.0592)	(0.0605)	(0.0569)	(0.0639)	(0.0600)	(0.0581)	(0.0532)	(0.0641)
P2 Procurement	0.0920	0.204	-0.100	0.141	0.267*	0.0660	-0.0815	0.336
	(0.169)	(0.182)	(0.181)	(0.191)	(0.161)	(0.176)	(0.169)	(0.231)
P3 Production	0.268	0.158	0.491**	0.174	-0.0414	0.0915	0.149	-0.679***
	(0.216)	(0.212)	(0.211)	(0.226)	(0.235)	(0.215)	(0.213)	(0.258)
P4 Logistics	0.0149	0.0375	0.156	0.112	-0.277	-0.433**	-0.00674	0.182
	(0.172)	(0.226)	(0.225)	(0.223)	(0.194)	(0.205)	(0.217)	(0.299)
P5 HR	0.215*	0.103	0.145	0.215*	-0.0623	-0.0754	0.150	-0.0180
	(0.119)	(0.107)	(0.114)	(0.110)	(0.117)	(0.105)	(0.113)	(0.151)
P7 Communication	0.149	-0.0548	0.140	-0.151	-0.132	0.0348	-0.151	-0.430**
	(0.145)	(0.131)	(0.133)	(0.144)	(0.135)	(0.137)	(0.128)	(0.168)
P8 Other	-0.371	0.120	-0.465	0.00768	-0.167	-1.216***	-0.934***	0.162
	(0.424)	(0.373)	(0.364)	(0.304)	(0.423)	(0.432)	(0.271)	(0.568)
M1 New business model	0.00315	-0.178	0.150	-0.193	-0.0847	0.0930	0.0860	-0.557***
	(0.142)	(0.160)	(0.164)	(0.168)	(0.167)	(0.149)	(0.142)	(0.214)
M2 Growth	-0.0923	-0.103	0.0203	0.0258	-0.0507	-0.0936	0.237*	0.432***
	(0.136)	(0.126)	(0.114)	(0.118)	(0.136)	(0.120)	(0.128)	(0.158)
M3 Efficiency	-0.211*	0.0886	-0.275**	-0.0905	-0.233*	-0.199*	-0.353***	-0.0297
	(0.124)	(0.116)	(0.111)	(0.119)	(0.125)	(0.114)	(0.111)	(0.142)
M5 Variety/flexibility	-0.0702	-0.378***	-0.113	-0.0538	0.0874	-0.0789	0.0946	-0.0976
	(0.136)	(0.132)	(0.130)	(0.139)	(0.141)	(0.134)	(0.131)	(0.158)
M6 Visibility/reach	-0.257*	0.0533	-0.270**	-0.117	-0.134	-0.0408	-0.0591	-0.123
	(0.135)	(0.120)	(0.118)	(0.119)	(0.118)	(0.125)	(0.123)	(0.142)
M7 Customer loyalty	0.0480	0.224*	0.0373	0.314**	0.0754	0.0761	-0.0280	-0.189
	(0.134)	(0.128)	(0.123)	(0.127)	(0.125)	(0.133)	(0.121)	(0.172)

Table 8: Perceived cost reducing impacts of platform used ctd

VARIABLES	**General**	**Labour**	**Recruiting**	**Investment**	**Intermediate**	**Administration**	**Information**	**Other**
M8 Competitiveness	0.255*	0.0664	0.240**	0.145	0.196	0.119	0.119	0.00961
	(0.136)	(0.119)	(0.118)	(0.123)	(0.132)	(0.125)	(0.124)	(0.168)
M9 Compatibility	0.106	0.255	0.666***	0.364	0.259	0.366	0.344	0.585*
	(0.222)	(0.264)	(0.233)	(0.270)	(0.209)	(0.249)	(0.212)	(0.340)
M10 Other	-0.000512	0.256	1.003***	0.492	0.686	0.872**	0.813**	0.939*
	(0.250)	(0.602)	(0.306)	(0.436)	(0.431)	(0.351)	(0.398)	(0.544)
B4 Implementation costs	-0.194	-0.0914	-0.239	0.249	0.461*	1.297***	0.467	0.0793
	(0.300)	(0.336)	(0.252)	(0.302)	(0.268)	(0.290)	(0.313)	(0.298)
B5 Variable costs	0.821***	0.369*	0.431**	0.595***	0.349	0.127	-0.201	-0.0210
	(0.208)	(0.189)	(0.200)	(0.190)	(0.214)	(0.224)	(0.236)	(0.346)
B7 Tech. infrastructure	0.260	0.163	0.468	0.710**	0.103	-0.425	0.316	0.665*
	(0.285)	(0.362)	(0.360)	(0.342)	(0.321)	(0.300)	(0.328)	(0.372)
B9 Labour skills	0.236	0.495***	0.0808	0.203	0.180	0.0792	-0.0369	-0.0205
	(0.163)	(0.165)	(0.166)	(0.147)	(0.156)	(0.170)	(0.151)	(0.237)
B10 Rising competition	-0.466	-0.226	0.00998	0.0866	0.569	0.835**	0.753	0.875**
	(0.503)	(0.537)	(0.652)	(0.625)	(0.379)	(0.367)	(0.486)	(0.393)
B11 Core competencies	0.0367	-0.986	0.599**	-0.487	0.0947	0.583**	-0.0599	-0.0225
	(0.421)	(0.672)	(0.289)	(0.340)	(0.402)	(0.273)	(0.358)	(0.430)
B12 Dependency	0.424*	0.0912	-0.0506	-0.316	0.537*	0.508	0.364	-0.570*
	(0.241)	(0.355)	(0.317)	(0.380)	(0.276)	(0.326)	(0.324)	(0.290)
B13 Data concern	0.0912	-0.277	-0.298	0.0544	-0.366	0.00308	-0.823***	0.655**
	(0.253)	(0.275)	(0.314)	(0.268)	(0.266)	(0.311)	(0.254)	(0.273)
B14 Data strategy	0.496	0.346	-0.228	0.248	0.732**	0.0378	0.415	-0.446*
	(0.402)	(0.304)	(0.278)	(0.289)	(0.287)	(0.381)	(0.304)	(0.245)
South	-0.151	0.278*	-0.00770	0.220	0.0751	-0.106	0.353**	0.109
	(0.146)	(0.144)	(0.128)	(0.144)	(0.154)	(0.144)	(0.146)	(0.159)
West	0.243**	0.0491	-0.0523	0.176	0.171	-0.0201	0.277**	0.0677

Table 8: Perceived cost reducing impacts of platform used ctd

VARIABLES	**General**	**Labour**	**Recruiting**	**Investment**	**Intermediate**	**Administration**	**Information**	**Other**
	(0.116)	(0.117)	(0.111)	(0.119)	(0.124)	(0.116)	(0.109)	(0.153)
Manufacturing	0.0883	0.0593	0.0329	-0.0480	-0.0131	0.479***	-0.155	0.0357
	(0.164)	(0.173)	(0.157)	(0.167)	(0.180)	(0.155)	(0.146)	(0.220)
ICType3	0.0513	-0.102*	-0.168***	0.0152	-0.0718	-0.0668	-0.103	-0.0239
	(0.0659)	(0.0613)	(0.0587)	(0.0610)	(0.0639)	(0.0609)	(0.0690)	(0.0777)
EnType==3	-0.258*	0.278**	0.342***	-0.0145	0.0964	-0.103	-0.0762	0.0753
	(0.133)	(0.131)	(0.119)	(0.131)	(0.122)	(0.121)	(0.121)	(0.160)
Enterprise group	-0.215*	-0.0533	-0.176	0.00374	0.122	-0.107	-0.0796	-0.0942
	(0.121)	(0.112)	(0.113)	(0.123)	(0.117)	(0.111)	(0.110)	(0.133)
Age (ln)	0.0325	-0.116**	-0.00886	0.00349	0.0180	0.0144	0.0543	-0.0976
	(0.0610)	(0.0583)	(0.0566)	(0.0593)	(0.0596)	(0.0615)	(0.0598)	(0.0801)
Firm size: med	0.0590	0.194	-0.129	0.0567	0.00347	-0.239**	-0.0440	-0.0791
	(0.130)	(0.126)	(0.133)	(0.115)	(0.121)	(0.114)	(0.133)	(0.167)
Firm size: large	-0.253	-0.0378	-0.367**	-0.0592	-0.191	-0.378**	-0.301*	-0.00781
	(0.166)	(0.185)	(0.166)	(0.165)	(0.147)	(0.157)	(0.159)	(0.200)
RTD	-0.00868	-0.0946	-0.168	-0.233*	-0.128	-0.192*	-0.128	-0.149
	(0.117)	(0.122)	(0.112)	(0.120)	(0.122)	(0.115)	(0.107)	(0.140)
Exports	-0.104	0.312**	0.155	0.115	0.0761	0.110	-0.108	0.195
	(0.113)	(0.128)	(0.124)	(0.128)	(0.120)	(0.116)	(0.123)	(0.176)
Digitization	0.160**	-0.0107	0.00941	0.0441	0.0661	0.124*	-0.0565	0.0300
	(0.0671)	(0.0680)	(0.0670)	(0.0717)	(0.0671)	(0.0667)	(0.0680)	(0.0826)
F, Prob > F	2.66***	1.41**	2.64***	2.56***	1.96***	2.84***	2.04***	1.55**
Observations	719	722	728	714	699	715	703	606
Correct predictions, %	47.84	53.50	40.95	51.94	47.72	38.18	43.51	57.94

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.; NB: Not significant/displayed: P1, P6, rival/changed platform, B3, B6, B8, B15, construction, tourism, sales/demand growth, RTD, broadband.
Source: WIFO survey and calculations.