Business Valuation is a Question of Trust



The European Business Valuation Magazine

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In this issue



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Valuation Ambiguities under the European Directive on Preventive Restructuring Frameworks

Increasing attention is currently being paid to the topic of business valuation related to the implementation of the European Directive on Preventive Restructuring Frameworks. Using a recent landmark case in the Netherlands as example, this article discusses valuation-related ambiguities and bottlenecks that may negatively affect the outcome of the restructuring process. Possible remedies to mitigate these effects are proposed.

Business Models, Use Cases and Analytical Approaches for Valuation of the Asset "Data"

Data as an asset is currently a hot topic in the valuation world. Today, more and more business models crucially depend on the use and the quality of data. This article provides an overview of typical corporate use cases of data – network effects, scale and embedding – and how a valuation practitioner can analyze, understand the underlying dynamics and find the limits of these use cases; it also sheds light on the biggest traps and pitfalls in the context of analysis and valuation of data.



Dr. Matthias Meitner, CFA Professor at the International School of Management (ISM), founder and managing partner of VALUESOUE.



Alexander Aronsohn, FRICS

Unlocking the Value of ESG

An overview of the work carried out by the IVSC over the past two years in relation to unlocking the value of ESG within the valuation process. This article provides a summary of the recently published IVSC perspectives papers on ESG and internally generated intangibles. It also illustrates some key findings from the IVSC ESG Survey for firms, investors and valuation providers and advises when more explicit ESG related valuation standards will be contained in IVS.

Thank you!

EACVA & IVSC would like to take the opportunity to thank all those who have contributed to the journal: Many thanks to *Ion Anghel, Maud Bodin Veraldi, Marc Broekema, Klaus Rabel, Ascanio Salvidio, Harri Seppänen* and *Javier Zoido* for supporting a great cause and for volunteering your time and expertise in the editorial board. We appreciate the efforts of our authors *Jan Adriaanse, Alexander Aronsohn, Marc Broekema, Stefan O. Grbenic, Matthias Meitner, Martin Schmidt and Andreas Tschöpel.* Last but not least, we thank our sponsors *Deloitte* and *Kroll –* your contribution is crucial to our ability of publishing the first and further editions of EBVM.

From the Editors

EACVA and IVSC launch the EBVM Magazine

The European Association of Certified Valuators and Analysts (EACVA, www.eacva.com) and the International Valuation Standards Council (IVSC, www.ivsc.org) are pleased to present our first issue of the new European Valuation Business Valuation Magazine (EBVM). The EACVA is the largest professional business valuation association in Europe, supporting the globally recognizes Certified Valuation Analyst (CVA) designation and has more than 1,000 individual members from 23 European countries. The International Valuation Standards Council (IVSC) sets International Valuation Standards which promote consistency and professionalism in the public interest. Both EACVA and IVSC share the common goal of consistent adherence to the globally recognized international valuation standards and continuous professional development. Compliance with standards is an obligation of each valuation professional, with national legislation always taking priority as part of this.

The EBVM is intended to be a European platform to discuss practice issues in business valuation. Up to now, discussions have mainly taken place on a national basis within the individual valuation professional groups. The EBVM aims to increase the transparency of valuation practice in European countries and to enable professional exchange on an international level. EACVA was founded in 2005 and along with its foundation, the German language journal BewertungsPraktiker is published quarterly. We are delighted to reach a new key milestone of publishing an international journal together with the IVSC.

Our new magazine aims to build a bridge between theory and practice. It is not a scientific journal, but the content is intended to be an important tool for practitioners based on scientific findings. Furthermore, every good valuation needs qualified data. With our capital market data, we want to give an important orientation for valuation professionals' activity. The first issue is intended to invite you to support us with your contributions. In the future we will also include other topics (marketing & management, excel tips, etc.). The editorial board consists of renowned representatives of the business valuation profession and will ensure the quality of the contributions. We thank our board members for their voluntary work which is greatly appreciated.

We hope you enjoy reading and look forward to your feedback



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Imprint

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Valuation Ambiguities under the European Directive on Preventive Restructuring Frameworks

- Insights from the Netherlands -

Increasing attention is currently being paid to the topic of business valuation related to the implementation of the European Directive on Preventive Restructuring Frameworks. This directive essentially aims at preserving value for those companies which are, in principle, economically viable, yet which are experiencing financial (cash) difficulties. However, opposing views by creditors on the value of these companies and on the extent to which a creditor should waive a claim makes the valuation process susceptible to unwanted external pressures. Using a recent landmark case in the Netherlands as example, this article discusses valuation-related ambiguities and bottlenecks that may negatively affect the outcome of the restructuring process. Possible remedies to mitigate these effects are proposed.





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I. Introduction 1. Background

In 2019, in the aftermath of the 2008 global financial crisis, the European Union (EU) adopted the European Directive on Preventive Restructuring Frameworks ('the Directive')¹ as part of a broader program to create a Capital Markets Union (CMU) in Europe. Originally, the Directive was to be transposed into national legislation by the 27 EU Member States no later than 17 July 2021. Although several Member States – including the Netherlands – had already translated the Directive into national legislation before this date, some Member States have requested a postponement until 17 July 2022.² Historically, most Member States have neither offered a court-supervised possibility to implement a debt restructuring plan based on the approval of the majority of creditors (outside of a formal insolvency procedure) nor have they felt any urgency to implement such a sophisticated hybrid restructuring process. Nonetheless, in the aftershock of Covid-19, many companies in Europe need to restructure yet want to avoid formal bankruptcy. Policy makers and practitioners are now being pressured to develop and implement efficient restructuring procedures and best practice principles.

2. The Directive at a Glance

The many publications related to the Directive indicate that its objective is twofold. First, it aims to minimize discrepancies between Member States concerning the range of restructuring tools available to debtors in financial distress, partly to avoid so-called "bankruptcy tourism". Second and more important, the Directive aims to prevent the insolvency of economically viable businesses and seeks to preserve as much economic value as possible by facilitating early and relatively easy access to preventive restructuring frameworks characterized by both informal and formal – hence hybrid – elements. To achieve these overarching goals, the Directive introduced several workout instruments such as moratorium proceedings to facilitate the negotiation process, and the socalled cross-class cram-down that allows a restructuring plan to be confirmed – subject to several conditions – by a judicial or administrative authority even if the plan was not approved by all classes of creditors. Furthermore, the debtor-in-possession proceeding was introduced, meaning that company directors should be able to remain in control of the company during the restructuring process instead of being replaced by an administrator or trustee. These newly introduced tools should facilitate debtors in (i) restructuring their business, (ii) minimizing the risk of dissenting creditors obstructing a fair and realistic restructuring plan, and (iii) aligning the restructuring process across all EU member states.³ From the creditor's perspective the Directive also offers certain advantages. First, the restructuring plan can only be confirmed if the going-concern value of the company exceeds its liquidation value, proving that the underlying business is viable. Second, the best-interests-of-creditor-test ensures that creditors should never be worse off under a restructuring plan when compared to liquidation proceedings.

Considering the new Directive, two important valuation concepts come into play. The first is the liquidation value and the second the reorganization value; concepts already known under the US Chapter 11 procedure. In general, the reorganization value can be defined as the enterprise value of the reorganized debtor⁴ whereby the enterprise value can then be interpreted as the net present value of future free cash flows or, from a going-concern perspective, the value in which the debtor's future earning capacity should be considered.⁵ More specific, in the context of WHOA, reorganization value can be equated with the company's total enterprise value and defined as the value distributable for the company's existing capital providers (i.e., shareholders and non-operational creditors) at the time of the confirmation of the restructuring plan and in accordance with their (legal) rank.

Both liquidation value and reorganization value appear straightforward, but in reality, their application turns out to be less so. As the concept refers to the reorganized debtor, the going-concern value should be determined after the restructuring plan's implementation, a process susceptible to many assumptions. In practice, the complexities in both valuation concepts can lead to serious disputes due to conflicts of interest between the different stakeholders of the subject company, be it (not limited) shareholders, management, senior and junior lenders, trade creditors, as well as tax authorities.

Disputes in bankruptcy cases regarding the debtor's enterprise value are relatively underexplored in the academic literature. Nonetheless, in practice, valuation and restructuring experts frequently disagree strongly about the key inputs in both a Discounted Cash Flow (DCF) and multiples-based valuation, although disagreement about the key inputs occur more frequently in DCF compared to the latter.⁶ In this context, determining a hypothetical going-concern value

¹ European Union, Directive (EU) 2019/1023, 26.06.2019, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32019L1023, last access 07.05.2022.

² This article was finished and submitted before July 2022.

³ IVSC, Mitigating valuation risks arising from the new EU restructuring directive, 28.05.2021, www.ivsc.org/mitigating-valuation-risks-arising-from-the-new-eu-restructuring-directive/, last access 28.05.2022; preliminary memo and speaker notes by Broekema (18.05.2021).

⁴ Pantaleo/Ridings, Reorganization Value, The Business Lawyer, Vol. 51 (1996): 419-442.

⁵ Eu, Valuation Issues in the UK Restructuring Plan, NUS Law Working Paper 2021/001 / EW Barker Centre for Law & Business Working Paper 21/01 (2021): 1-27.

⁶ Ayotte/Morrison, Valuation Disputes in Corporate Bankruptcy, 166 U. PA. L. REV. 1819 (2018): 1819-1851.

for a company subject to some degree of distress and in urgent need of a workout solution with creditors is a potential tinderbox. It often leads to fierce debates between stakeholders, given that economic claims and interests on the value of a reorganized debtor may have to be waived. Moreover, defining the future of a company without distress is often less complex and sensitive than that of one which must undergo a tough restructuring and operational turnaround process, and whose nature of operations and assets may change as a result. Consequently, there is inherent uncertainty in estimating a hypothetical going-concern value compared to the observable cash distribution sum in a liquidation value⁷ due to time constraints, ambiguity of information, and the unavailability of and inaccessibility to relevant and objective inputs required for the valuation.

II. Valuation Challenges and Implications for Practice: insights from the Netherlands

The Directive was implemented in the Netherlands on 1 January 2021 and is known as the Act on the Confirmation of Private Plans (in Dutch: "WHOA"8). To illustrate the relevance of business valuation and subsequent challenges under the Directive, a recent landmark case in the Netherlands⁹ has shown that stakeholders have strongly divergent views on the debtor's financial outlook and performance, as reflected in a substantial range of values. For the context it is important to emphasize that, as is generally the case with other schemes under the Directive, the WHOA provides a framework on the basis of which the court can ratify a private debt restructuring agreement informally negotiated between a company and its creditors and shareholders, i.e., without active intervention of a judge along the way. Approval means that the agreement is binding to all creditors and shareholders involved in the agreement. Interestingly, the WHOA acknowledges two types of procedures, namely the public and closed agreement procedure, which is of importance for reasons, amongst others, of confidentiality.

This article uses the aforementioned landmark case example in which an undisclosed company faced financial difficulties following the Covid-19 pandemic. The company was financed by equity contributions of its (indirect) shareholders and by debt through a senior facilities agreement facilitated by a group of financiers, de facto controlled by one main creditor with a senior ranking.¹⁰ Based on the recently implemented WHOA and through a closed agreement procedure, the company offered, after informing its

creditors about a proposed so-called stay, a restructuring plan to its creditors mainly involving a postponement of interest payments, temporary non-testing of covenants, and some technical adjustments of the facilities agreement. Based on the proposed restructuring plan, the shareholders were also willing to provide an equity contribution of €4 million. The main creditor on the other hand, demanded an early loan repayment and wanted to exercise their (security) rights. Furthermore, the main creditor requested the court to appoint an independent restructuring expert (a legally defined role within WHOA¹¹) as they had little confidence that the debtor's management would take sufficient account of their interests when preparing and offering a definite restructuring plan. The WHOA stipulates that each creditor may request the appointment of a restructuring expert who can take the lead to offer a plan to (some of) the debtor's creditors and shareholders. If this request is granted by the court and the expert is appointed, the debtor may no longer offer a plan independently while remaining a debtor-in-possession. As the majority of the creditors (the main creditor represented over € 107 million of the debtor's total outstanding debt of \in 118.0 million¹²) supported a court-appointed restructuring expert, the court decided in favor of this request.

Additionally, the WHOA stipulates that a restructuring plan (in this case proposed by the restructuring expert) must inform the creditors and shareholders of the debtor's liquidation and reorganization value. Hence, both the company, the shareholders, and the main creditor hired professional, independent valuation experts to determine these two values. Yet where the debtor's valuation experts determined the liquidation value at € 49.4 million, the main creditor's two valuation experts determined a liquidation value of € 58.6 million and € 69 million, respectively. Based on the calculated liquidation values it appeared that in the event of liquidation of the debtor's assets in a bankruptcy, it was to be expected that the distribution of proceeds would be insufficient to cover the main creditor's entire claim. In other words, the liquidation value 'breaks' into the creditor's debt. However, in this case the liquidation value was not a topic of debate between parties and any existing difference of opinion following from the calculated liquidation values would not result in different outcomes.

When it came to the reorganization value the views were not the same given the different valuation assumptions used. First, valuation experts hired by two minority shareholders and some creditors determined the reorganization value at \in 186.3 million. The valuation experts on behalf of the company determined the debtor's reorganization value

⁷ Determining the liquidation value may not be as straight forward as it seems and may also involve a fragmented asset sale where assets (e.g. business units) are continued on a going-concern basis.

⁸ The Dutch name for Act on the Confirmation of Private Plans is Wet Homologatie Onderhands Akkoord, hence abbreviated as WHOA.

⁹ ECLI:NL:RBAMS:2021:6521, https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBAMS:2021:6521, last access 30.05.2022.

¹⁰ In the case at hand, there was also a creditor with a super senior ranking however for the purpose of this article her position will remain undiscussed.

¹¹ In Dutch named "Herstructureringsdeskundige".

¹² ECLI:NL:RBAMS:2021:1876, https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBAMS:2021:1876, last access 30.05.2022.







at € 222.6 million and € 275.7 million, respectively. Finally, the main two creditor's valuation experts determined the debtor's reorganization value at € 105 and € 120.4 million, respectively. For the record, at that time, the debtor's total outstanding debt was € 118.0 million (book value). The figure above presents an overview of the different values that illustrate the opposing views of all parties involved. Interestingly, the company considered a much higher reorganization value compared to those determined on behalf of the main creditor, indicating the main creditor was in the money while the main creditor considered themselves to be out of the money.

The independent restructuring expert decided – although not legally obliged under WHOA – to engage an independent valuation company¹³ unrelated to the interests of the parties involved, to determine the reorganization value from an objective and neutral view; this resulted in a reorganization value of € 190.5 million. Thereafter, the court considered that the independent valuation expert made it sufficiently plausible that the debtor's reorganization value exceeded its debts, so that the value 'breaks into the shares', i.e., that the company was in principle viable thus suitable for a workout plan and vote under WHOA. Finally, the court confirmed the restructuring expert's plan that had been accepted by a majority of the (classes of) creditors, which resulted in the need for a cram-down.

Needless to say, the presence of multiple, diverging valuations on behalf of different classes not only results in the process taking more time than planned. It also increases the risk of a further decline in value and even a possible bankruptcy scenario as the company will remain in a state of distress during this period.

III. Causes of Diverging Value Perceptions

While in general, practice shows that valuation outcomes often diverge in cases of opposing interests, estimating an enterprise value is even more sensitive in restructuring issues, as in this case. As the legal framework may force parties to waive part of their claims, in certain situations it can also give parties legal rights to pull the business strategically or opportunistically towards them by means of a debt-for-equity swap.

Causes of diverging value perceptions in restructuring processes are, in theory, many, so for the context of this article the authors discuss a selection. For example, Richter & Thery argue that uncertainty plays a prominent role as there is no real market verification. They state: "Another disadvantage of restructuring is that, although it may be chosen democratically and even legitimately by a majority of creditors, it involves a certain amount of uncertainty as to the enterprise value because there is no real market verification. The creditors do not divide the cash proceeds among themselves but instead have to resort to estimates of enterprise value which are unlikely to be as convincing. Based on those estimates, they will have to reinvest their liquidation distribution in exchange for which they will receive a paper under the Plan representing their pro-rata share of the restructuring value. And not all creditors will always be equally convinced by such reinvestment."14

Article

¹³ For full disclosure, the authors of this article were hired by the independent (court-appointed) restructuring expert to act as independent valuation experts.

¹⁴ Richter/Thery, Claims, Classes, Voting, Confirmation and the Cross-Class Cram-Down. INSOL Europe (2020): 1-45.

Earlier, Baird & Bernstein recognized that uncertainty and ambiguity accompany any valuation procedure, however the valuation problem in a reorganization case is fundamentally different compared to more 'regular' cases, as uncertainty plays a more prominent role.¹⁵

Another cause of diverging value perceptions relates to the opposing interests of the different classes in which parties with a claim or interest in the debtor are categorized. Such opposing interests are possibly caused by creditors' risk appetite, their policies and other principles (e.g., tolerance, attitude, preference) that they adopt in order to pursue their interests. The allocation of 'creditor class' is of importance to the creditor because the reorganization value defines which class the creditor concerned is in, and therefore which classes are in the money or out of the money, i.e., who is for example eligible for a debt discharge or not (often referred to as a "haircut"). Consequently, categorizing those with a claim or interest into classes can result in diverging valuation perceptions depending on their position within the value distribution. Interestingly, according to Baird & Bernstein, small differences in valuation assumptions can easily lead to changes in the valuation by 10% or 20%; these assumptions can therefore easily be driven by forms of self-interest.

A third cause of diverging value perceptions may be attributed to cognitive biases. These can be defined as systematic patterns of irrationality human beings are exposed to. Their powerful effects on human judgments, particularly in situations characterized by high degrees of complexity and uncertainty, were revealed in the early seventies of the last century by the renowned social scientists Tversky & Kahneman.¹⁶ Recent empirical research by Leiden University among valuation experts¹⁷ has shown that perceptions are also susceptible to other biases, including the recently described "engagement bias".18 The researchers defined engagement bias as when business valuators (or any professionals for that matter) are hired, they (consciously or unconsciously) are affected in their judgments to favor their clients' interests. In an experimental empirical survey study the researchers determined that when valuation experts represent their client's interest, this relationship affects the valuation experts' judgments so that these are more in tune with their client's wishes. If their client is looking to sell and would therefore benefit from a high valuation, the valuator gives the object a higher value than when the valuator represents a buyer who would benefit from a lower valuation. Interestingly, when participants were asked to motivate their answers regarding the adjustment of the valuation, none of them hinted at the potential influence of engagement bias, and the researchers therefore assumed that engagement bias operates largely unconsciously, as well as that the participants had the tendency to rationalize their intuitions regarding the company's value post-hoc.

Furthermore, the researchers argued: "more worrisome in light of the impending aftermath of the COVID-19 pandemic, engagement bias ultimately risks unduly liquidating economically viable companies when the liquidation value of a company is erroneously deemed higher than the going-concern value after restructuring, or contrastingly the allocation of significant resources to save companies that in reality have little chance of surviving." In analogy to previous research, valuation experts representing the interests of creditors in potential in the money or out of the money classes in restructurings may thus be affected by the same engagement bias, with potentially the same consequences as in the case of buying or selling a company. In line with the literature challenging the independence of auditors, the researchers demonstrated that due to engagement bias, valuators' professional judgments can be overshadowed by the urge to satisfy clients, ultimately leading to suboptimal valuations and loss of value. Moreover, it may potentially broaden and extend disputes that might arise or have already risen between the different classes. Meanwhile, the distressed company may drift further into failure.

In practice, it is worthwhile exploring which remedies could mitigate strongly diverging valuation outcomes or, at least, contribute to a higher level of acceptance of valuation outcomes both by courts and individual stakeholders of the subject company. The case example may provide clues: these are discussed in the next section.

IV. Remedies to Minimize Valuation Disputes in Restructuring Contexts

In the case in this article, both the restructuring expert, the independent valuation team, and the engaged legal advisors quickly realized that some sort of engagement bias may have played a role, thus explaining the diverging valuation outcomes. They also understood that the independent valuation outcome could become subject of lengthy debates with and among the stakeholders. Given the company's problematic situation, this obviously was unwanted as it could jeopardize the chances of a fast and successful restructuring and with that, the prospects of survival. It was also thought that the broader the support base for the independent valuation outcome, the better the chance of successful negotiations with stakeholders, i.e., consensual agreement, or at least only a small part of the creditors that would need to be "cram-downed" under the WHOA.

¹⁵ Baird/Bernstein, Absolute Priority, Valuation Uncertainty, and the Reorganization Bargain, 115 Yale Law Journal (2006): 1930-1970.

¹⁶ Tversky/Kahneman, Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. Science, Vol. 185 (1974): 1124-1131.

¹⁷ The authors were members of the research team.

¹⁸ Broekema/Strohmaier/Adriaanse/Van der Rest, Are Business Valuators Biased? A Psychological Perspective on the Causes of Valuation Disputes, Journal of Behavioral Finance, 23:1 (2022): 23-42.

To achieve this, it was decided by the independent restructuring expert to ask the court permission to hire an independent strategy consulting firm as part of the valuation process with the prime task of reviewing the company's business plan, as well as scrutinizing and validating the underlying assumptions regarding market outlook. With that, the inputs for the valuation calculation by the independent valuation team was largely objectified. By then giving all relevant stakeholders the chance to review the results and to give feedback, a further remedial step was taken to minimize diverging opinions and to create common ground for the eventual valuation outcome.

Based on the literature and the approach chosen by the hired consulting firm, a set of questions has been developed that may, in practice, help to objectify the valuation inputs in a restructuring situation. In essence, these should, help answer the one main question, i.e., despite its current debt-structure and given the market outlook, is the company able to survive?

Viability

The literature shows that many factors determine the viability of firms.¹⁹ Taken together, these factors indicate that four key questions must always be addressed when assessing viability in a restructuring process:

- 1. Is the centrally defined customer need that can be solved with a product or service within the range of the unique resources, core skills, and competencies available to the enterprise, and can that be converted into positive cash flows?
- 2. Does the synthesis between the company's (idiosyncratic) resources match customer needs (i.e., strategic fit), or has a suitable market been found for this (i.e., resource-based approach)?
- 3. What strengths and weaknesses does the company have in relation to its (direct) competitors: what comparative (i.e., in resources) and what competitive (i.e., in market position) advantage and disadvantage does the company have, respectively?
- 4. Which external factors (e.g., political-legal, economic, socio-cultural, and technological) constitute opportunities, threats, and risks to the company's future revenue model?

Furthermore, the four questions can be divided into nine value-related clusters including specific (sub)questions. These clusters align with the following theoretical and conceptual perspectives: *Resource-Based View of the*

*Firm*²⁰, *dynamic capabilities of firms*²¹, *business models*²² and governance and accounting.²³

(1) Value proposition

- 1. How does the firm create value with the delivered products/services?
- 2. Who are the customers/target groups?
- In what customer need do the products/services provide?
 How distinctive are the products/services compared
- to competitors for example in quality/price?
- 5. Does the company have an established customer base, good reputation?
- 6. Are there alternatives/substitutes with respect to the products/services, and how threatening are these in terms of quality and price?
- 7. Which marketing channels and promotion does the company use, and are they appropriate?
- 8. Which problems do the products solve for the customer; where exactly do the products derive their value and are customers willing to pay cost-effective prices?

(2) Value developments

- 1. How big is the market and what are the market's main (expected) developments in the next 3-5 years?
- 2. Is it a growth market or a declining market, and is it an innovative, dynamic and competitive market?
- 3. Can the company continue to distinguish itself from (potential) competitors?

(3) External value net [network of external stakeholders]

- 1. Who are the company's main (external) stakeholders and to what extent does the company depend on them?
- 2. Is the company under pressure from powerful stakeholders?
- 3. Who are the main competitors, is new entry taking place, and how does the company compare to its main competitors in terms of cost, quality, and image?

¹⁹ This section is partly based on [in Dutch] Adriaanse/Verdoes/Van der Rest in: Kerstens/Rikkert/Broeders/Feenstra (editor), Wet Homologatie Onderhands Akkoord, Insolad Jaarboek 2021: 1-20; See also Thomson, Dimensions of Business viability, Appendix H. Dimensions of Business viability (2005), http://bestentrepreneur.murdoch.edu.au/; D'Souza/Wortmann/Huitema/ Velthuijsen, A business model design framework for viability; a business ecosystem approach, Journal of Business Models, no. 3, ed. 2 (2015): 1-29.

²⁰ See e.g., Barney, Firm Resources and Sustained Competitive Advantage, Journal of Management, volume 17, issue 1 (1991): 99-120; Amit/Shoemaker, Strategic Assets and Organizational Rent, Strategic Management Journal, no. 14, ed. 1 (1993): 33-46; Kraaijenbrink/Spender, Theories of the Firm and Their Value Creation Assumptions (presentatie), SMS 31st Annual International Conference, Miami, US, 2011.

²¹ See e.g., Teece/Pisano/Shuen, Dynamic Capabilities and Strategic Management, Strategic Management Journal, no. 18, ed. 7 (1997): 509-533; Bowman/Ambrosini, Value Creation Versus Value Capture: Towards a Coherent Definition of Value in Strategy, British Journal of Management, no. 11, ed. 1 (2000): 1-15; Bowman/Ambrosini, Identifying Valuable Resources, European Management Journal, no. 25, ed. 4 (2007): 320-329.

²² See e.g., Teece, Business Models, Business Strategy and Innovation, AJIBM, no. 2 (2010): 172-194; Morris e.al.,The entrepreneur's business model: toward a unified perspective, Journal of Business Research (2005); D'Souza/Wortmann/Huitema/Velthuijsen, A business model design framework for viability; a business ecosystem approach; Journal of Business Models, no. 2 (2015): 1-29.

²³ See e.g., Bushman/Smith, Transparency, Financial Accounting Information, and Corporate Governance, Economic Policy Review, no. 9 (2015): 65-87; Monks, Creating Value Through Corporate Governance, SSRN Paper 314284 (2003); Moxey/Berendt, Creating value through governance – towards a new accountability: a consultation, London: ACCA (2014).

(4) Internal value chain and valuable resources

- 1. Which unique (comparative) resources (including intellectual property) does the company have at its disposal and can these be shielded (sustainably) from competitors?
- 2. What is the distinctive core of the enterprise from which it derives its uniqueness? And to what extent do products and services fit these core competencies?
- 3. To what extent is there an internal and external fit between the sources and products brought together?
- 4. How firm are the contracts that the company has concluded with its internal and external stakeholders?
- 5. What processes/activities does the company perform, and is it necessary for the company to perform them itself? Are there possibilities to outsource or (other) flexibilization of costs?
- 6. Is the production process efficiently organized?
- 5. Does the company focus on its core competencies?

(5) Adaptive value

- 1. Is the company flexible and adaptable in terms of material, personnel, and financial?
- 2. Can the enterprise react to changing circumstances and developments in the value chain?
- 3. To what extent is the company bound by contracts?

(6) Risk value [risk factors that can destroy value]

- 1. How sensitive is the value creation (and derived cash flows) to changes in turnover and cost structure?
- 2. What are the short and long-term risks represented by means of a PESTLE analysis (i.e., Political, Economic, Social, Technological, Legal, Environmental factors) and a SWOT analysis (i.e., Strengths, Weaknesses, Opportunities, Threats)?
- 3. Is the company dependent on a (major) customer(s), or supplier(s) or other stakeholders (e.g., landlords)?

(7) Governance value [management and oversight]

- 1. Is there a clear, streamlined information system and rules and procedures?
- 2. Is the management capable of giving direction, making choices, and motivating staff?

(8) Financial value

- 1. What do the key ratios liquidity, solvency and profitability look like, and what are the expectations?
- 2. What do the forecast cash flows look like and how do they relate to the repayments?
- (9) Miscellaneous and ancillary value [additional value-creating or value-destroying elements]
- 1. Are there company-specific factors that could impede viability?
- 2. Is there conflict within the company, an impending departure of a crucial stakeholder, or disputes among stakeholders?

These clusters make the underlying narrative logical and visible, and show implicit assumptions, hypotheses, and/or paradigms in a coherent, transparent, and holistic way. This makes the viability issue more testable and, when used as inputs for the cashflow assumptions, more objective.

In sum, it can be stated that in the case study, it helped parties overcome some of their diverging opinions and even when differing beliefs persisted on some issues, the strategy process as a whole helped to create common ground and "language" for negotiations. To conclude, it largely contributed to the eventual successful confirmation of the plan.

V. Conclusion

To minimize valuation disputes in restructurings under the Directive, business practice benefits from a jointly supported business valuation, something that often appears to be a utopia rather than a reality. Nevertheless, one of the Directive's aims is to prevent insolvency of viable businesses and preserve their inherent value by facilitating early access to preventive restructuring frameworks. Instruments that contribute to minimizing loss of value and legal costs following extensive debates on the distressed debtor are thus worthwhile exploring, with the aim of enhancing a distressed transaction (e.g., a debt discharge under WHOA) that is fair to all parties. In this context, the concept of fairness can best be understood in terms of fair dealing and fair price, as exemplified by the Delaware Court of Chancery²⁴: "fair dealing embraces questions of when the transaction was timed, how it was initiated, structured, and negotiated, and how the transactional approvals were obtained" and, "fair price focuses on the economic and financial considerations of the challenged transaction."²⁵ In this article we have described complexities related to valuation in restructuring, as well as providing practical insights and ideas for remedies against valuation ambiguities, such as the appointment of both fully independent valuators and strategy consultants in the course of the early (informal) restructuring process, in order to create common ground and (a higher degree of) fairness. •

²⁴ A non-trial jury court recognized as US' most prominent forum for handling corporate disputes and involving the affairs of thousands of companies including the majority of Fortune 500 companies and those listed on the New York Stock Exchange and NASDAQ (see Broekema/Strohmaier, From Leiden to Delaware: How empirical legal research on valuation biases was used in a US courtroom, Leiden Law Blog (2022), www.leidenlawblog.nl/articles/ from-leiden-tot-delaware-how-empirical-legal-research-on-valuation-biases-was-used-in-a-us-courtroom, last access 30.05.2022.

²⁵ See Laster, Memorandum Opinion Addressing Claims for Breach of Fiduciary Duty in Connection with Freeze-Out of Minority Partners in Salem Cellular Telephone Company (2022), https://law.justia.com/cases/delaware/ court-of-chancery/2022/c-a-no-6885-vcl.html, last access 30.05.2022.

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Business Models, Use Cases and Analytical Approaches for Valuation of the Asset "Data"

Data as an asset is currently a hot topic in the valuation world. Today, more and more business models crucially depend on the use and the quality of data. This article provides an overview of typical corporate use cases of data – network effects, scale and embedding – and how a valuation practitioner can analyze, understand the underlying dynamics and find the limits of these use cases. Furthermore, the article sheds light on the biggest traps and pitfalls in the context of analysis and valuation of data. This article provides the reader with an overview of typical toolsets for deriving a quantitative view on – and therefore setting the basis for establishing a cash flow forecast for – this often rather qualitative topic.

I. Introduction

Data and its processing have become increasingly important throughout the business world in recent years. While data has always been highly relevant to the success of business models, modern technological capabilities have taken this asset to a whole new level.

For the valuation professional, the question of the value of the asset "data" and its contribution to the value of the company is increasingly being asked for various occasions. The problem is that the treatment of data as a standard intangible often does not show the desired success, since the valuation techniques known from textbooks focus more on the pure valuation technique and less on the fundamental understanding of the monetization model.

Of course, the problem of translating analytical findings into a value figure also exists in a very pronounced form in data valuation. However, the techniques are often already known from the valuation of start-ups in particular or the handling of highly uncertain forecasts in general from other valuation case constellations. In fact, the quality of the valuation rather stands and falls with the fundamental analysis of the business model behind the asset "data". This is why the analytical aspect is also the core focus of this article.

Not in focus here, however, are questions about the variety (alternative, structured, unstructured), the distribution, the origin (synthetic, real) or the quantifiability (quantitative, semi-quantitative, qualitative) of data. These aspects are, of course, equally important and can (must!) be included in the analyses described here.

The article begins with a general overview of the necessary valuation understanding for the asset "data" (section II.), moves on to the three generic value-retaining business model logics of data (section III., each with examples) and ends with some notes on critical analysis topics (section IV.).

II. Understanding the value relevance of the asset "data"

Fundamental to the understanding of the value of data is the move away from partial analyses at the company level and towards a holistic, competition-oriented perspective. In recent months, one could have had the impression that the general developments – increasing data and data processing relevance in our business environment – should increase the valuations of affected companies across the board. However, increasing use of data or increasing possibilities of data processing – like all technological progress – do not per se increase value. As long as technological progress is open to all competitors, its contribution is initially value-neutral. Only base on a differentiated consideration of the relevant effects possible value advantages and disadvantages might arise.

A simple example helps here: Imagine that there are a few mail order companies in an economy that previously only recorded data from their customers in a rudimentary way. But now, as a result of technological development, they have new possibilities to process their data. They can record more and better data, create structured customer profiles and thus channel their sales activities much better – also with the help of artificial intelligence.

What value does the data have for existing mail order companies? In our simple example: Probably no value worth mentioning! Every mail order company benefits from the expanded possibilities. The battle for customers and sales has simply moved to a new level. If we additionally abstract from new entrants here and assume no significant fundamental differences in activity, then everything remains largely the same for the mail-order companies.

As long as a competitive economy as a whole benefits from technological innovation, no major changes in value are to be assumed – apart from differences in detail – either aggregated or for the individual companies. However, data may make a greater contribution than before to the overall (unchanged) business value. But even this is anything but certain in the above example (more on this later).

We already know similar effects from the early introduction of the automobile for the logistics industry or the development of computers for the economy in general. An advantage in the sense of an increase in value cannot be determined without a competitive comparison or a deeper fundamental analysis of the differentiation effects of the target company. This is one of the most important insights into the valuation logic of data. The decisive valuation question is therefore not about the increase in data and improved data analytics, but rather whether competitive advantages or new value creation opportunities may arise qua business model or access to certain data.

In answering this question, one then finds oneself in the middle of fundamental analysis. In essence, you are where you are with other potential competitive advantage drivers: looking for customer stickiness, barriers to entry, pricing power, etc. And in particular, the question of the sustainability of these competitive advantages always arises: are they only temporary (from which the first movers may benefit temporarily) or do they shield from competition in the long term (we then speak of "moats")? To summarize: Data valuation is always and everywhere a question of the business model respectively the use case.

III. The generic use cases of "data"

Data basically falls into three different use cases or business model logics: Network Effects, Scale and Embedding. There are opportunities and threats at all of these use case levels. For didactic reasons, we will start with the strongest business model logic, the network effects.

1. Network Effects

a) General Aspects

Network effects refer to the increasing attractiveness and profitability of an offer through increasing use of this offer.¹ The quality of networks is often determined in business using Metcalfe's law². This assumes a proportional increase in benefit per additional network user. For business valuation, however, this idea usually falls too short, as it probably only meaningfully reflects the actual dynamics of attractiveness in exceptional cases. As shown below, in most real world cases much more differentiated analysis techniques are necessary.

The classic example of network effects is the telephone. If just two people have a telephone shortly after its invention, this does not help the invention - its radius is simply too limited. But if more and more people have a telephone, then values develop. The value of the network increases with each additional user. This also shows an important aspect of a network in the economic sense: interaction takes place from endpoint to endpoint. Data can generate different types of network effects. The simplest data network effect aims at the social benefit to participants (Facebook, Tinder, etc.). Here, the benefit of the participants increases with the increasing offer by other participants. However, networks that aim at personal utility are considered semi-fragile, as the amount of participants can at some point show a value-flattening or even value-destroying effect: Too much publicity discourages participants on Facebook to reveal personal data or opinions; lowering the average offer quality on Tinder leads to higher search costs for participants. At a certain point, such networks need to further push their development or risk being caught up by imitators or niche providers.

Marketplace data networks (Ebay, Uber, etc.) are another variant. Supply and demand meet here, and the increasing amount of users on both sides increases the liquidity and attractiveness of the supply. Marketplaces are considered natural monopolies, but they are also often subject to a degression problem. On the one hand, the frequently possible multiple use - multi-tenancy is responsible for this: sellers on typical sales platforms can also offer their products on other platforms without large additional costs, which leads to the emergence of niche platforms and gives imitators the opportunity to catch up. On the other hand, the added value of liquidity often knows a limit beyond which other criteria count; in ride-sharing business models such as Uber, for example, it can be observed that the added value of additional network participants almost disappears when the waiting time in large cities is less than five minutes; then other aspects become relevant. Critical analysis improvements (increasing accuracy) can also be a variant of data network effects. A disease screener often becomes more accurate with additional data input from patients/interested parties. Depending on the proprietary nature of the data and the need for professional overlay, such business models are sometimes more and sometimes less threatened by copycats.

Another variant of data network effects aims at real-time information, such as the traffic app Waze. Users enter their data and benefit from the information provided by other users. The system gains both speed and coverage through additional users. There is also often a threat here due to the fact that the basic data is quite simple in nature and therefore multi-tenant effects can occur.

In addition, there are a few more typical data network effects that will not be discussed further here for reasons of space. In many cases, data network effects are also a mere by-product of the core offer of companies. Their value contribution is then regularly limited, but not necessarily low. Netflix, for example, definitely achieves positive value contributions through its offer recommendations, which are derived from the behavior of other users.

In any case, two things are important for understanding network effects:

- The term "network effects" is very fashionable today, but often rather overused. If a service does not have a clear relationship between increasing utility and better data collection, then it does not have network effects, at best it has economies of scale (more on this later).
- It often turns out that existing network effects need to • be nurtured and developed in a meaningful way in order to continue thrive.

Katz/Shapiro, Network Externalities, Competition, and Compatibility, The American Economic Review (1985): 424-440; Katz/Shapiro, Systems Competition and Network Effects, Journal of Economic Perspectives (1994): 93-115; Church/Gandal/Krause, Indirect Network Effects and Adoption Externalities, Review of Network Economics (2008): 337-358.

² Gilder, Metcalf's Law and Legacy, in: Forbes ASAP (September 1993): 158-159.

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Figure 1: Cost Side Analysis

b) Example Analysis

An analysis of network effects for the example of a health screening app is presented below.³ We analysed the company 15 months after its launch. It is a subscription business model that provides users with a health forecast regarding a certain set of symptoms. The forecast is also made possible by the fact that the users are matched with twin user profiles (anonymously), which are then supposed to help them deal with the symptoms (there is thus a kind of communication between users). The users themselves have to enter their own data, on the basis of which the forecast and the feeds are then made. It is not a purely original data model, i.e. medical findings were already incorporated into the initial version (the founding team also consisted in part of medical professionals). Nevertheless, data represented the most important source of development and the actual driver of the business model. In the context of our evaluation, it was guestionable how the business would develop in the future after initial successes.

At the core of our analysis was the question of whether the business model can establish network effects (or possibly already has done so). Several investigations were performed for this purpose. First, a cost-side analysis was carried out. This showed how the customer base, which has grown considerably since its introduction, as shown in Fig. 1, is made up over time of acquired customers (i.e. those with customer acquisition costs, CAC) and free customers who have joined on an unacquired basis. The left Y-axis shows the customer acquisition costs (CAC) per user – here, as an example, the initial value of \in 3 per actively approached and converted customer; the right Y-axis shows the proportion of customers acquired through acquisition in relation to the total number of users. The exact separation of both groups was not easy, so the values shown are only approximates. Efficiency effects in customer acquisition (gradually declining CAC per acquired customer even without the effect of freely acquired customers) were already eliminated here for the analysis. The X-axis shows the months since introduction.

The picture in Fig. 1 shows a very attractive trend. The share of non-actively acquired customers has increased significantly over time. After initially low interest outside the acquired customer base in month 15 over 80% of the monthly new users were nonacquired users (of course less on a total customer basis due to lagging effects). No reason was found why CACs should increase in the future (I will come back to the risk of increasing CACs in section III.2). In month 8, the product was described in a popular semi-scientific journal that is quite often read by members of the target group. This was also the point at which the ratio changed noticeably in favor of the non-acquired users for the first time.

On the basis of pure cost analysis, however, it was still difficult to see whether the influx of non-acquired customers was only a marketing success that might fizzle out again in the future or whether other effects were at work. Therefore, we took a closer look at the users. First, we analyzed the activity and its development over time (so-called power user development). Fig. 2 shows the development of "Daily Active Users" (DAU) per week. DAU are those users who actively use the app in some form on a given day (input from the user was necessary for use). The values on the Y-axis (left axis) represent the percentages of the total users at the time. The X-axis indicates on how many days per week such activity was measured. For example, in month 5, approx. 55% of all users used the app on exactly one day per week, etc.

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³ In this concrete example, the project was not directly a health screening app, but a relatively similar business model; with a view to the didactic presentation (and the reduction of complexity in the presentation), this abbreviated form has been chosen here. The data and also the concrete time periods are partly intentionally distorted with a view to disclosure restrictions of the concrete project.

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Figure 2: Power-User-Development



This figure shows a quite value-positive picture. On the one hand, the DAU distributions for each month show the desired so-called smile effect. This means that although a certain proportion of users only use the app on few days per week and only a few users are somewhere in the average intensity of use, at the back end (6 days or 7 days of use per week) there is an increase again (the curve looks like a smiling mouth, hence "smile"). These latter users are the power users who are particularly important for the development of network effects. On the other hand, it also shows the desired shift in DAU distribution towards more power users over time (i.e. from month 5 to month 10 to month 15). This is also accompanied by the increase in average days of use per client (dashed lines, right y-axis).

The retention rates, i.e. the users remaining on the app (the subscription can be cancelled monthly) also show an interesting picture. Especially for the power users, but also for the important group of near-power users (3-5 days of use per week, this customer group could become power users), increasing and very high retention rates at the time of evaluation are shown (see Fig. 3, on the X-axis the months since introduction are plotted).

Fig. 4 shows an equally attractive picture for the retention rates of non-acquired users, i.e. users who may have been acquired through network effects. Their retention rates are significantly higher than those of acquired users (the fluctuations in the early months can be attributed to the rather small number of non-acquired users at that time, which means that the retention rates change noticeably even for small numbers of jump offs).

At this point in the analysis, we were already able to rule out the possibility that the economic development of the app business model was purely due to a marketing effect, because the product did show attractive (and apparently even sustainably attractive) features for a large proportion of users. Nevertheless, it could still be a hype that collapses sooner or later. Therefore, we continued to look at the predictive quality of the app, i.e. the actual Unique Selling Proposition (USP). This analysis was difficult and only possible with some elements of sketchiness and only in retrospect. Due to the time delays between the indication of the app and possible confirmation on the one hand, as well as the still imperfect data basis (not every user was able to provide feedback on the app later), assumptions had to be made in some cases. In particular, it was difficult to compare the competition with a rival app (the next best offer) that was launched somewhat later than the app under consideration here, and about which we also had only partial information. The results of our analyses are shown in Fig. 5.

A deeper analysis of forecast quality aimed at the contribution of network conditional interaction (twin interaction), cf. Fig. 6.

The "twin" interaction here is not really a pure twin, but actually several twins, or triplets, quadruplets, etc. (but the name "twin" was used internally). Moreover, the increasing interaction did not seem to us to be a consequence of increased user activity, but rather – after further analysis – a consequence of the better database, which made this tool seem more and more useful to use. Generally, the curves (the shaded area around the lines represents the uncertainty-related range of the forecast quality) show an attractive development in the sense of existing network effects. It seems as if (also with expert medical support) the data

dividual user, according to our analysis it was definitely of value for users to be active on several levels – i.e. on

It turned out to be positive for the app under consideration that all similar apps offered had at least partial "cold start" problems, i.e. one could already benefit from a good forecast quality after a few days of use, but the true value only became apparent with

4 In month 4, there was an analytical issue at the forecast app level, resulting in a slight recalibration of the forecast model.

longer-term use (and continuous input).⁵ This basically increased the switching costs of the business model, which strengthened the competitive position of the app we evaluated. In addition, this cold-start problem also has an impact on the entry barriers of the business model. While it is not difficult at all for more new offerings to enter the market (anyone with some data at hand and the basic medical know-how can do so), it arguably becomes increasingly difficult to successfully establish themselves in the market as time goes on. This is because the increased forecasting quality of the app under consideration here first has to be caught up.⁶

We have carried out further analyses as part of the evaluation, which will not be presented in detail here: further retention rate analyses, development of the so-called unit economics, i.e. the profitability per user over time, etc. Pricing power analyses, i.e. the question of whether a certain pricing power exists, would have been nice, but were not possible in a meaningful way because we had no corresponding data points (and all competing products run at approximately the same remuneration level). The final result of our analysis and overall assessment is not reported here. It may be revealed, however, that we were – as so often – in a weighing-up-process here.

For the purposes of this article, it is sufficient to show which aspects we focused on in the analyses, what data problems there were and what conclusions were

Figure 4: Retention-Rates for Different Acquisition Channels

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aggregation and processing at the level of the target

app represent a positive contribution to the forecast

quality.⁴ Uncertainty about the quality of the progno-

sis also decreased over time - this can be seen in the

narrowing band around the prognosis value over time.

It also appears that there was a decoupling from the

comparable app in the final months before the assess-

ment date. But there was admittedly a lot of uncer-

tainty (and intense discussions with founders) in these

Our conclusions based on the forecast quality analysis

were cautiously positive here. However, the competi-

tive situation was problematised in this specific case by the fact that there were already several competing

products at the time of the evaluation (not shown here)

and that we were faced with the multi-tenancy problem already mentioned: It was not prohibitively difficult for

users to use several apps concurrently. It is true that a

certain input on the part of the user was necessary per

active use (but this input was similar for all products

offered, so there was no so-called activity energy ad-

vantage or disadvantage), and a fee of a similar mag-

nitude also had to be paid for the competing products.

But due to the relevance of the forecast result for the in-

analysis results.

several apps.



⁵ Social media business models like LinkedIn typically have noticeable coldstart problems, as building the history of posts and building the individual's network takes time and energy from users.

⁶ However, we still considered it possible that certain medical professionals could still enter the market later – with manageable cold-start problems – due to their basic knowledge and forecasting skills in the specific case. This, in turn, reduces the barriers to entry.

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Figure 6: Forecasting-Quality vs. "Twin"-Interaction



drawn from the partial analyses presented. Through our analyses, we have in any case come very close to answering the important question about the possible future development of network effects (or the possibly already existing network effects) of the app under consideration.

2. Scale a) General Aspects

In principle, most data use cases tend to fall into the "scale" category, i.e. that the increase in attractiveness of the offer outweighs the cost increases as the amount of data increases. There is, however, no direct interaction between the two end points. Scale can also generate strong competitive advantages, but they are typically less strong than those of network effects. It should be noted in the analysis, however, that there are often major differences between classic industrial scale effects and data scale. These are:

- More or less strongly decreasing marginal value of normal data (at company level): While the marginal value contribution for the company normally remains the same with a higher output quantity in fixed-cost-heavy industrial production, normal data often shows a more or less strong degression here (lower scale elasticity). The reason for this as will be shown later is that the added value of additional data points (depending on the concrete business model) is often limited sooner or later.
- Rising costs in connection with high-quality data points: While in the industrial sector the costs for individual inputs tend to become lower due to volume discounts, the opposite effects are often seen in the data sector. If, beyond a certain level, companies want to add more high-quality data, the costs rise, often prohibitively high. Chat bots that answer customer queries directly are often very strong for

standard questions ("Where is my package?"), but for many special queries they are still very weak. Here, a manual supplement would help, but it is expensive. For unstructured queries ("No one at Meier knows that the boots are there") they are still largely stumped. Here, however, further development of artificial intelligence may help in the future. For other business models, however, a solution to this quality-data-cost problem is hardly possible, even with improved processing technology.

The importance of these two effects for valuation cannot be overemphasised. The first effect often ensures that the very competitive advantage of the early stages of such business models can be caught up by imitators in an elegant way over time, and without the usual time pressure. The second effect directly attacks the question of the fundamental attractiveness of the business model.

b) Example analysis

Below, two example cases will be briefly discussed: a hiking app (example 1) and a credit rating agency (example 2).

Example 1: Hiking app

The idea of the business model was originally to generate network effects through the interaction of hikers who share their routes with each other and discuss them, thus building up a large network that eventually becomes self-sustaining and thrives. Those who wanted to use the app had to pay a monthly fee or enter at least one hiking route themselves, which - if it was rated accordingly high by other users – then led to a discount on the fees. But the analyses of potential network effects guickly showed that the network idea does not work. Almost all indications showed that the hiking app hardly promoted any significant user interactions. Measured interactions were mostly irrelevant to the quality of the offer (the routes). However, there was a clear increase in data: more and more routes were entered and also rated by other users. This suggested that sustainable scaling effects may be possible. For the analyses, general cost-side investigations were carried out first. The acquisition costs per data point (data acquisition costs, DAC) showed a slightly decreasing curve. The reason for this was that more and more users entered routes (hoping for good ratings from other users, which would then have earned them a discount). The relatively low number of very positive ratings, which would have actually led to a discount, meant that the net costs for the company per new data point were rather low. On the revenue side, the initial picture was also encouraging. Unit economics, i.e. profitability per user, increased over time due to both overhead cost degression and falling DAC.



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Figure 7: Hiking Routes Matching Diagram

However, in the weeks leading up to the analysis, there was a slowdown in user acquisition. This was one of the reasons why we were asked to conduct a business model analysis. By involving a group of hiking enthusiasts (a mixed group from Sunday hikers to intensive mountaineers), a supply/demand data matching diagram was created, which showed the following results (cf. Fig. 7).

In the analysis, routes were catalogued in categories 1 to 20. Numbers 1-5 are tours that can also be found (in a slightly modified form) in a classic hiking guide book. 6-10 are tours that have links to hiking guidebook routes, but already with a noticeable twist of their own. 11-15 are routes that still touch on some of the cornerstones of the classic hiking guide routes, but essentially already enter new (not always sure footed) terrain. 16-20 are routes that are independent of the known routes in terrain that is unknown to the general public. The intra-category levels for the four sections had further criteria, such as places to stop for refreshments, trail quality, etc.

The presentation was certainly partly subjective. Especially in the higher categories, hypothetical routes often had to be discussed.⁷ Several interesting aspects emerged from the analysis. First, the app seems to suffer from the classic tail problem, namely that especially the data that show up in the outer areas of the distribution (the so-called tails, here the higher categories) were not supplied a lot, but at the same time there was high demand for them. The reason for the low supply in the tails is, on the one hand, that most of those who

know the "lonely routes" do not use the app anyway. And those who know the "lonely routes" and simultaneously use the app are of course not interested in having this loneliness destroyed by a pack of Sunday hikers. So they do not share these routes with others. The solution to this would be active interventions by the company to increase the data quality in the tails (send out or consult hiking professionals), but this is associated with increasing DAC. Scale effects are probably not to be generated in the tails.

Second, however, a hot spot of the app becomes apparent. This is the area that is just ahead of the classic hiking guide routes in terms of attractiveness. According to our analysis, the hiking app could actually become a kind of "extended hiking guide book". There is demand in this area and also a possible expansion of the offer. This would determine a new niche. But whether sustainable economies of scale are possible here must be examined in further analyses.

For this, the effect of more data on supply and demand in the hot spot and in relation to the individual routes was examined more closely. Here, the saturation problem that is often observed with data became apparent: The first four to six evaluations of recorded routes were still helpful for the other users. However, each further assessment provided decreasing marginal utility. Put it differently: When a user wrote the third assessment, this assessment greatly helped other users in their choice of walking routes, but the 50th assessment made little difference to the status quo of the previous 49 assessments. This effect is closely related to another data problem of the hiking app: users do not need high data accuracy. Whether the route is described one way or another is of little relevance. Even whether the route is rated at 4.3 (out of 5 points) or 4.2 is of little importance

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The intensive mountaineers and hikers probably also knew more concrete 7 tours in the higher categories, but did not want to share them with us. More on this point later.



Figure 9: Credit Rating Matching Diagram



to hiking enthusiasts. The saturation problem is related to the accuracy problem and can be illustrated in general – not specifically for the hiking app – via the graph in Fig. 8.

The light blue line here shows the walking app case. The illustration represents a hypothetical, pure all-otherthings-being-equal analysis. In fact, there are also business models that promise a high marginal benefit at low data quality with high data volumes. However, the described correlation can often be seen in reality. For those who do not need accuracy, even a small amount of data is sufficient for decision-making, but those who need high accuracy will be able to find value in additional data even with a large amount of already existing data (the following example illustrates this aspect once again). And finally, the concept of accuracy also generally encompasses the case for speed. I.e. where highly up-to-date data is needed (e.g. traffic app), at least temporal accuracy is also required.⁸

Example 2: Credit bureau

The second example case shows a brief and simplified analysis of a credit agency.⁹ Here, network effects could be excluded already from the beginning of the analysis, as there was no interaction at all between the users (those seeking information) and the data providers (analysed profiles).

Here, too, the (data) supply of the credit bureau is contrasted with the (data) demand of the users. For reasons

Figure 10: Variable Costs per additional unit of valuable Data resp. Input Products (normalised at 100%)



of comparison, this distribution diagram was also divided into 20 different categories.

Fig. 9 shows that the "hot area" is already much larger than in the hiking app. This is closely related to the accuracy requirements of the business model and the largely high standardisability of the analyses. In addition, the tail problems are much less pronounced with the credit agency than with the hiking app. In general, the comparison of the two business models with regard to the costs of additional data shows the following picture in Fig. 10.

The graph shows in the solid lines the typical cost trends for increasingly valuable data. The more the data-driven companies want to penetrate the "tails", the more expensive it becomes (lonely routes have to be entered by the providers of the app themselves because no user wants to do it; special cases of credit scoring have to be meticulously gathered because there are so few of them). However, the marginal costs differ significantly for the individual business models. While the hiking app has to bear costs above the costs of the first unit very early on, because the supply of attractive routes by users is quickly exhausted in terms of increasing data quality, the credit agency can continue to access "cheap" data much further. For comparison, a typical manufacturing industrial company is also shown. Here, costs usually decrease continuously (albeit weakly) because the company achieves volume discounts and learning effects with high quantities of input products. Industrial enterprises usually do not know any "tails".

⁸ And finally, there are also business models where content accuracy and speed go hand in hand, such as autonomous driving.

⁹ In this specific case, it was an investment-side valuation of a large listed company that has been very successfully represented on the market with this and similar analytical tools for years.

- However, the course of the dashed lines is also interesting. These show the net costs for each additional value-added data unit. Here, the pure costs are still adjusted for additional attractiveness gains of the additional data unit. For example, users of the hiking app naturally find it better if more attractive routes are included, which leads to an effect of higher revenue generation that is not dissimilar to the network effects, but not identical. The same applies to customers at the credit agency, because there, too, a better database will lead to more attractiveness. This does not usually apply to industrial companies, or only to a small extent. Just because more cars are being built, for example, the customer will not automatically find the car better.¹⁰ It is also important to know that the classic scale effect
 Maintenance require ments of a physical are equipped by the measuring system that is not dissimilar to the network effects, but not identical. The same applies to customers at the credit agency, because there, too, a better database will lead to more attractiveness. This does not usually apply to industrial companies, or only to a small extent. Just
- is also important to know that the classic scale effect (fixed cost degression) is not yet depicted here, as this is only variable costs. This effect is an additional add on and has a positive impact on all business models presented here.

On the basis of these value effects of variable costs alone, however, it can now already be shown in which areas it is interesting and meaningful for the companies to generate additional data. As long as the dotted lines are below the red 100% line, it is worthwhile. Above that it is no longer. The additional inclusion of fixed costs then changes this slightly (which is also important for the concrete calculation), but qualitatively the statement remains unchanged: The hiking app reaches its limits quite early, the credit agency much later (among other things because of the accuracy requirements), but there are limits there too, the industrial enterprise can continue to produce endlessly.

This also shows that the term "scale" in data-driven business models must be interpreted more broadly than described in the textbooks on business studies. The hiking app shows scale in a narrow range, but will always remain limited. The credit agency, on the other hand, already benefits from scale in very broad use cases, even if the classic definition of scale – cf. the industrial company – may not apply in the complex cases either. The latter is of course important for the assessment, but it probably only marginally limits the credit bureau's development possibilities.

3. Embedding

The last area considered here for value-positive use cases of data is the embedding of data in other – mostly, but not only – physical products. This is directly related to the ideas of the "Industry 4.0" concepts, i.e. the data-driven optimisation of industrial processes. Typical areas of application are, for example:

- Maintenance requirements and efficiency measurements of a physical product: Many machines today are equipped by the manufacturers with an internal measuring system that indicates when (remote) maintenance work is necessary, when overloads are imminent, how the usage can be designed as efficiently as possible, etc. The data for the measurements are held sometimes almost exclusively by the manufacturers or usually they are the only ones who can process these data meaningfully.
- System structuring: If several machines can only be used efficiently in the context of other machines or at least depend on the action of other machines, or if the production process requires frequent changeovers of the machines, data on the performance of the system often allow noticeable improvements in structuring and processing efficiency. The robotics industry, for example, has recognised this issue for many years. For many customers, a robot, i.e. the hardware, cannot be used in any meaningful way without a functioning system. This is where the system integrators, for example, come into play as service providers who take over this task for the customers.¹¹ This is likely to change in the future, as modern data solutions can also provide simple, efficient system structures here without the costly use of third-party service providers. But this is only one example of many in which production systems can be set up much more efficiently through the use of data.
- En-passant data generation: In some cases, one can measure data that are only peripherally related to the actual product but can provide information on adjacent areas. For example, transport products today are often equipped with monitoring measurements for the entire area route they pass on their way. Warehouse (storage) transport systems provide data, for example, on regular inventory, on possible damage to the stored products, on efficient filling positioning in the warehouse, but sometimes partly also on observations that are completely independent of the warehouse (e.g. cleanliness in adjacent areas), which they can measure on their way during their delivery/ whilst on their delivery route.

Embedding can deliver added value without the issues described above such as network effects or scale – only because of the processing of the data at the specific client company. However, they are sometimes also provided with scale or network effects, which can further increase their value. For example, if you want to operate a construction site efficiently, you can also benefit from the experience gained on other construction sites by using appropriate construction site transport solutions and the retrieved data on construction progress, construction

¹¹ In the large, i.e. industry-scale sector such as the automotive industry, however, manufacturers also offer such system support themselves.

errors, degree of drying of certain areas, instabilities, etc. Such data can then also be combined with the empirical values from other construction sites – the data is then aggregated by the transport solution provider, for example – in order to generate these scale or network effects.

As with the business model logics presented so far, embedding in a data-competitive world is only valuable if it generates certain competitive advantages for the provider. A warehouse transport system that does not generate relevant scale or network effects will have to have some other advantages (data processing, forecasting processes, lock-in effects such as high switching costs, etc.) in order to stand out from competing providers. With generally advancing technological development, such advantage is often at least fragile from an analysis point of view (but it does not mean that it does not exist). In many cases, me-too products can be generated that are clearly data-driven, but also deliver similar value to the customer as all other competing products.

This brings the discussion to the most common data topic in many analytics cases today, end-customer data collection. Especially in the retail sector, immense data sets are now collected by all providers on all peripheral customer characteristics. However, the very fact that much of the data is not exclusive, because every provider collects this or similar data, shows exactly the value problem in these data sets. In most cases, the data is a support for general efficiency in the offer, but nothing that provides a value advantage over the competition (even if young companies very often claim this). From an analysis point of view, it is essential to check for exclusivity with reference to the potentially value-relevant data. In our experience, it is very often the case that the exclusivity is unfortunately only given in data characteristics that cannot be monetised in a substantial way. However, there are also examples of valuable end-customer data generation that follow the idea of valuable exclusivity. Without disclosing here the lesser-known good ideas of some young companies, an interesting example from a mature company should be mentioned here.

The French utility Suez S.A., which among other things is very strong in water supply, has been offering a kind of "granny insurance" (working title at the time) for some years. Since Suez can observe the water use of its customers very closely, the company can also extract typical usage patterns. For example, customer A gets up every morning at 7 a.m., goes to the bathroom, brushes his teeth, etc. The data can be used for this purpose. Through the huge amount of data, normal time/quantity deviations can also be predicted for this. The idea of the granny insurance is that irregularities in water use can be used to make predictions about the well-being of elderly people in particular, which can then, for example, lead to their relatives being informed or an emergency call being triggered directly. Over time, Suez has become very efficient in the error-first (false alarm) vs. error-second (no alarm despite problem) assessment due to the existing database – whereby of course the slight bias of preferring to send an alarm in case of doubt is also taken into account. This is the status at least according to our – admittedly already several months dated – knowledge. Informally, it is also reported that international food supply companies collect specific qualitative customer data through the door-to-door contact of suppliers, from which general lifestyle behaviour can be derived. Regardless of the legal admissibility of this data collection, such data could of course also be used in many other related areas in a commercially viable way in the future.

IV. Four typical problems of analysis 1. The incumbent/start-up problem

All the effects described (network/scale/embedding) must of course be considered dynamically and with a view to the future. For those companies that have already (partially) increased the value of their data, the analysis is usually easier. However, it is more interesting to evaluate the data of companies that are still on the potential value journey. And this is where the incumbent/start-up problem very often arises. There is an old – often forgotten – rule of thumb for start-ups (independent of the data issue) that says: the start-up product must be at least 50% better, cheaper, more convenient, etc. than the existing product in order to become successful. The background to this statement is that the established companies with existing products often still have room to react. Be it through price reduction (margin sacrifice) or by exploiting the efficiency or further development possibilities that would not be necessary without the competing product. I can also say from my experience that quite a few of the "little better, little cheaper" start-up ideas fail precisely because of this misunderstanding of the flexibility of the incumbents (long-established companies).

With data, incumbents often – but not always – have a big potential advantage. They may still be somewhat sluggish today (or at the time of analysis or valuation) – which often also has to do with resistance to cannibalisation effects or fear of margin squeeze effects.¹² But in many cases they carry the potential for a much larger creation of data than, for example, a young start-up company. This is because they have a much larger initial asset base (customers, data, etc.) than the newcomers.

¹² An extreme example of a refusal for further developments is Eastman Kodak. The company had itself helped to develop digital photography, but then preferred to continue to focus on the old classic analog technology, as monetization through the additional sale of photographic films seemed advantageous in the latter case. As a result of this wrong strategic decision, the company later had to file for insolvency.

Many of the big success stories of today's data giants are essentially due to deep-sleep problems in the existing competition, and they usually stem from a different past. For example, Google founders Larry Page and Sergey Brin once desperately tried to sell their intellectual property (especially the so-called PageRank algorithm, which made the early Google Serach Enginge so strong) to other, larger search engine operators. However, they did not meet with much interest here.

Today, however, almost all incumbents are at a high alert level. Of course, this doesn't mean that there aren't still niches or that there aren't still areas where the incumbents just don't have the attractive access to data that the start-up does. But it does mean that in many cases the first-mover advantage has to be critically examined in terms of its medium- to long-term defensibility vis-àvis companies that are already in the market and may be less data-heavy today.

2. The metrics problem

An elementary analysis problem for the external analyst of valuation expert is that a large part of the analysis data (or the metrics, see above: retention rates, DAU, MAU, etc.) for the data used in the business model a) is only available from the company to be analysed itself and b) can usually hardly checked for plausibility externally. Analysis and valuation thus require a very strong basis of trust. The problem is: In many cases, the companies are well aware of this very pronounced information asymmetry. From my own experience, I can report that there have been analysis cases in which the analysis data base was surprisingly presented differently after my initial (not so positive) analyses, or where there were doubts about the analysis data right from the start. This is certainly not the standard case and it probably only makes up a small part of the analysis cases, but the danger of analysis data manipulation is always present in view of the high value leverage that often depends on a few critical analysis data.

I certainly don't want to go as far as venture capital investor Josh Wolfe, who in an interview¹³ divided all the data experts in start-up companies into those who drive the development of the business model and those who, behind the curtain, prepare the metrics for investors, etc. in such a way that the desired value-positive effects show up in the figures. Nevertheless, when analyzing data as an asset, there is a particular need for the analyst or valuation expert to be vigilant about metrics input. On the investor side, there are some plausibility and consistency checking techniques – not described in detail here for good reason – but the means are still unfortunately limited.

Anyway, a valuation practictioner should check whether the management of the target company closely monitors the development of the value relevant metrics, as well as whether management allocates resources and devises business and market strategies based on the information taken from this monitoring. Internal reporting packages usually provide very good insights into management's data management practices. It should be seen as a red flag, if management does not actively and reasonably monitor data metrics and/or does not reasonably takes these metrics as a basis for decision making.

3. Added value through artificial intelligence?

If data – as often described somewhat over-enthusiastically – is "the new oil," then the use of artificial intelligence (AI) is the new internal combustion engine that will lead this new oil to its true development. Gone are the days of using purely statistical techniques to try to fathom correlations in the data pool. The techniques of AI are usually difficult to understand for analysts and valuation experts with an educational background in business. Whether machine learning, natural language processing or vision/speech systems: the algorithms behind them are regularly relatively complex.

However, most AI techniques today – with a few exceptions – do not exhibit any particular exclusivity. AI can migrate from one company to another, it already migrates very quickly, and it will continue to migrate in the future. Competitive advantages from the use of a particular AI technology can rarely be considered sustainable. And this is especially true in the context of the incumbent/ startup problem described above.

Strong AI technology can, of course, help turn first-mover advantage into sustainable competitive advantage more quickly. It can help to extend the existing business model to adjacent areas and therefore not infrequently increases greater flexibility in development, especially for young companies. And these aspects are also very important in the analysis of data-driven business models. But beyond that, the contribution of the processing technology of the data should not play a prominent role especially in the medium- to long-term perspective – which is regularly in focus in business valuation (again: apart from a few specifically IT-driven exceptions).

Real options in the asset "data"

A typical analysis case for a start-up is the situation in which the company collects data on a large scale beyond the actual business model and does not (yet) have a meaningful use for it. A data pool is created that may or may not play a role in the future. The question here is

¹³ Zer0es TV, The Shocking Truth About VC-Backed Companies, Interview with Venture Capitalist Josh Wolfe, www.zer0es.tv/interviews-and-analysis/theshocking-truth-about-vc-backed-companies, last access 12.07.2022.

about the real option that may lie dormant in the data collection. Such potential values are regularly very difficult to grasp. In any case, a structured analysis of the value potential under the following aspects is recommended:

- How proprietary is the data? Can another competitor also collect this or comparable data?
- For which areas (often outside the current business model) could the data be used?
- Who outside the company would be interested in this data?
- What is the potential future value of the data? (It is not uncommon that a new general interest in the data could generate very strong value, but in some cases only marginal value is achievable).
- What would be the competitive situation once these data are of general interest?
- What are the disadvantages of the fact that these data may only be put to economic use at some later point in time?
- And strategically: Does it make sense to actively pursue data collection with a view to monetization, or should it remain a pure en-passant collection for the time being?

This structuring can give the latent data pool a much more economic face. And this often already helps the company (and the valuation expert) a great deal. In many cases, however, the answer will probably still remain vague. Of course, such analyses, which usually do not concern the core business model, always involve additional work for the analyst, but they are absolutely necessary in today's dynamic world. From our experience, in some cases a joint management / valuation expert analysis can certainly raise possible value potentials (and also provide management with strategic support here).

V. Conclusion

The asset "data" is a hype from a valuation point of view! And in quite a few cases it is overhyped! Today, almost all companies are moving towards a more data-driven business model. And in many cases the competition will reach a new level playing field. However, this does not mean that there are not very attractive data-driven business models. It is just that intensive fundamental analysis is required to understand (or rule out) the value potentials. Special attention must be paid to the dynamics of business model development. This article only shows some exemplary analysis approaches without claiming to be complete. Depending on the individual case, there are many more analysis needs.

In any case, "data" is probably an intangible asset that is often not well-suited to the typical toolset for (expert) valuation of intangibles, since the fundamental analytical aspect is regularly neglected there. Therefore, we would like to conclude by pointing out once again the elementary insight of this article: Data valuation is always and everywhere a question of the business model resp. use case. •

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Article

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Unlocking the Value of ESG

An overview of the work carried out by the IVSC over the past two years in relation to unlocking the value of ESG within the valuation process. This article provides a summary of the recently published IVSC perspectives papers on ESG and internally generated intangibles. The paper also illustrates some key findings from the IVSC ESG Survey for firms, investors and valuation providers and advises when more explicit ESG related valuation standards will be contained in IVS.

1. Introduction

In the past few years, the explicit quantification of ESGs within the valuation process across all specialisms (business valuation, financial instruments, and tangible assets) has gained even greater prominence across all markets. As a result, the explicit quantification of ESG's within the valuation process has become a key topic for the IVSC as not only is it in the global public interest but also it meets a market need particularly as more standards and regulations are incorporating specific reporting requirements for the quantification of ESGs within valuation. This pressure will only increase with the establishment of the newly created International Sustainability Standards Board for by the IFRS Foundation Trustees and their stated intention

"to deliver a comprehensive global baseline of sustainability-related disclosure standards that provide investors and other capital market participants with information about companies' sustainability-related risks and opportunities to help them make informed decisions."¹

During the past year the IVSC have issued an agenda consultation and four perspective papers on ESG from a business valuation and real estate perspective and an ESG survey of firms, investors, and valuers to understand where they are in their journey in considering ESG within their valuation process.

II. IVS and Current ESG Requirements

Currently, the obligation to consider ESG within the valuation process is implicit in IVS. More specifically, under IVS 101 Scope of Work para 20.1 "all valuation advice and the work undertaken in its preparation must be appropriate for the intended purpose." This is further referenced in IVS 102 Investigations and Compliance para 20.1 where it states that "investigations made during the course of a valuation assignment must be appropriate for the purpose of the valuation assignment and the basis(es) of value".

Moreover, within IVS 105 Valuation Approaches and Methods para 50.36 through 50.4, the adjustments for additional risks within the cash flow projection require detailed consideration and this will include ESG elements.

As part of the valuation process the valuer needs to understand trends and developing issues. The valuation industry will have to make a significant contribution to the implementation of ESG and as a result will face major challenges around both incorporation and providing transparency as part of the valuation reporting process.

III. Agenda Consultation

In October 2020 the IVSC issued an Agenda Consultation which defined ESG as "the criteria that together establish the framework for assessing the impact of the sustainability and ethical practices of a company on its financial performance and operations. ESG comprises three pillars; environmental, social and governance, all of which collectively contribute to effective performance, with positive benefits for the wider markets, society, and world as a whole."²

The recent events of the coronavirus crisis have only acted to accelerate the broader adoption of ESG and Environmental, Social, and Governance (ESG) factors have become central tenets in the capital allocation process for both the providers of capital (e.g., investors) and the users of capital (e.g., corporations). Many institutional investors leverage ESG filters to guide their investment strategies and improve returns.

The events of 2020 to 2022 have only acted to accelerate the broader adoption of ESG frameworks for the following reasons:

E - Environmental disasters have become too prevalent and destructive to ignore.

S - Social unrest has obligated enterprises to take a point of view on issues important to their workforce and broader stakeholders.

G - The pandemic has challenged the governance structures of every industry and forced management to continuously pivot as they guide a path to recovery.

IV. ESG and Business Valuation

The IVSC Business Valuation Board published a perspectives paper on ESG and Business Valuation in March 2021. The paper stated that "though fewer people today debate the importance of ESG and its impact on value creation, most struggle to make sense of the web of interconnected standards, disclosure requirements, and ESG ratings. The lack of uniformity results in wildly varying disclosures, and in effect, a hesitancy from the valuation profession to wholeheartedly embrace the value creation impact of ESG. Like other market participants, for valuers to successfully incorporate ESG into valuations they will need reliable ESG metric reporting that is consistent between companies, across geographies, and over time."³

² IVSC, IVS Agenda Consultation 2020, www.ivsc.org/consultations/ivs-agenda-consultation-2020, last access 21.07.2022.

¹ ISSB, About the International Sustainability Standards Board, www.ifrs. org/groups/international-sustainability-standards-board, last access 21.07.2022.

³ IVSC, Perspectives Paper: ESG and Business Valuation, 02.03.2022, www.ivsc. org/perspectives-paper-esg-and-business-valuation, last access 21.07.2022.

This comment is further supported in a paper by Bradford Cornell, which states that "the rating organizations differ not only in how to measure the various ESG criteria, but also with respect to what criteria are deemed worthy of measurement. In some cases, the criteria are so numerous that it is difficult to separate those that are germane from those that are not. For instance, Bloomberg's ESG data covers 120 environmental, social, and governance indicators. Nonetheless, virtually all the raters include the most highly publicized indicators in their ratings. These include carbon emissions, climate change effect, pollution, waste disposal, renewable energy, discrimination, diversity, community relations, human rights, and independent directors. But they still fail to agree on how these indicators are to be measured."⁴

Further detail is contained within the paper on ESG and Financial Performance which drew the following six conclusions about the relationship between ESG and financial performance after aggregating evidence form one thousand plus studies published between 2015 and 2020:

- 1. Improved financial performance due to ESG becomes more marked over longer time horizons.
- 2. ESG integration, broadly speaking as an investment strategy, seems to perform better than negative screening approaches. A recently released Rockefeller Asset Management study finds that ESG integration will increasingly be demarcated between "Leaders" and "Improvers" with the latter showing uncorrelated alpha-enhancing potential over the long term (Clark & Lalit, 2020).
- 3. ESG investing appears to provide downside protection, especially during a social or economic crisis.
- 4. Sustainability initiatives at corporations appear to drive better financial performance due to mediating factors such as improved risk management and more innovation.
- 5. Studies indicate that managing for a low carbon future improves financial performance.
- 6. ESG disclosure on its own does not drive financial performance.⁵

The potential financial implications arising from climate-related and other emerging risks, all of which likely having direct valuation implications, may include, but are not limited to:

- asset impairment, including goodwill,
- changes in the useful life of assets,
- changes in the fair valuation of assets,
- effects on impairment calculations because of increased costs or reduced demand,
- changes in provisions for onerous contracts because of increased costs or reduced demand,
- changes in provisions and contingent liabilities arising from fines and penalties,
- changes in expected credit losses for loans and other financial assets.

The perspectives paper on ESG and Business Valuation concluded that ESG solutions require collaboration between stakeholders throughout the capital markets. The paper further concluded that "currently there is no shortage of opinions when it comes to how, and even if, to proceed with the standardisation of ESG disclosures and reporting. However, regardless of the path taken by standard setters, including the IVSC, ESG factors represent fundamental considerations to inform valuation analysis. As such, these first steps to begin incorporating ESG considerations into valuation practice are critical for the relevance, and therefore the sustainability, of the profession."⁶

Subsequent research in KPMG's Cost of Capital Study 2021 considered Sustainability and Return and ESG as a driver for long term performance. In the paper KPMG state that "in business, what you cannot measure, you cannot change. Over the past years, also driven by regulations, public and non-public companies have thus introduced ESG and sustainability frameworks and have begun reporting on certain defined indicators."⁷

The paper also states that in relation to cost of capital "some studies suggest that companies with robust ESG practices exhibit a lower cost of capital, lower volatility and fewer instances of bribery, corruption and fraud. Conversely, studies have shown that companies performing poorly in ESG have a higher cost of capital, higher volatility due to controversies and other incidents such as labour strikes, fraud, environmental pollution and accounting or other governance irregularities."

Further research contained in the "Foundations of ESG Investing: How ESG Affects Equity Valuation, Risk, and Performance"⁸ breaks down ESG investing into the following three main areas that each have their own investment objective:

⁴ Cornell/Damodaran Valuing ESG: Doing Good or Sounding Good?, 19.03.2020, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3557432, last access 02.08.2022.

⁵ Tensie Whelan, Ulrich Atz, Tracy Van Holt, and Casey Clark, Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015 – 2020, NYU Stern and Rockefeller Asset Management, Published 2021. Available at: www.stern.nyu.edu/experience-stern/about/departments-centers-initiatives/centers-of-research/center-sustainable-business/ research/research-initiatives/esg-and-financial-performance

⁶ VSC, Perspectives Paper: ESG and Business Valuation, 02.03.2022, www.ivsc. org/perspectives-paper-esg-and-business-valuation, last access 21.07.2022.

⁷ KPMG, Cost of Capital Study 2021, home.kpmg/de/en/home/insights/2021/10/cost-of-capital-study-2021, last access 21.07.2022.

⁸ Giese/Lee/Melas/Nagy/Nishikawa, Foundations of ESG Investing: How ESG Affects Equity Valuation, Risk, and Performance, The Journal of Portfolio Management (July 2019): 69-83.

Article

- 1. **ESG Integration:** the key objective is to improve the risk-return characteristics of a portfolio.
- 2. Values-Based Investing: the investor seeks to align his portfolio with his norms and beliefs.
- 3. **Impact Investing:** in which investors want to use their capital to trigger change for social or environmental purposes.

The paper noted that a review of previous research reports had found the correlation between ESG characteristics and financial performance to be inconclusive and also noted as stated in Krueger's 2015 paper⁹ that "many empirical studies analysing the link between ESG, and financial performance do not strictly differentiate between correlation and causality."

As a result, the research article took a different approach and instead of looking at the correlation between ESG characteristics and financial performance in historic data analysed first the *"transmission channels from ESG to financial performance"* and then *"verified the transmission mechanisms using empirical analysis"*.

The paper concluded that "by creating transmission channels, we have shown how ESG has affected the valuation and performance of companies, both through their systematic risk pro-file (lower costs of capital and higher valuations) and their idiosyncratic risk profile (higher profitability and lower exposures to tail risk). Thus, the transmission from ESG characteristics to financial value is a multi-channel process, as opposed to factor investing in which the transmission mechanism is typically simpler and one dimensional."

V. A Framework to Assess ESG Value Creation

In May 2021 the IVSC Business Valuation Board published a second perspectives paper in the series titled A Framework to Assess ESG Value Creation. The paper noted that Environmental, Social, and Governance (ESG) factors have become a central tenet in many enterprises' corporate strategy. While companies track and measure how certain investments impact their overall ESG ratings or performance, many often fail to effectively take the further step to estimate and then capture how such investments translate to return on investment. Corporate finance principles to measure return on investment are most easily applied for discrete projects in which the output from such activities is financial information (e.g. profits, cash flows, capital formation, etc.) that can be identified, tracked, and quantified. Core finance principles used to measure ROI struggle to translate the non-financial outputs of ESG investments, to the impact on financial information.¹⁰

The paper explored the link between ESG and Intangible Assets and provided the view that potential ESG value creation would manifest in the formation and/or maintenance of intangible asset value. Furthermore, noted that certain characteristics of intangible value creation can help valuers assess how ESG investments may create value. Firstly, because value creation or degradation for intangible assets, and therefore ESG investments, is not linear. For instance, many ESG investments will likely show a small return in the initial years after investment as value is created, and then exponential growth thereafter. Secondly because the ability to create intangible value, and thus the ESG value creation opportunities, varies by industry. To generate economic value from ESG investments, or any investment, an enterprise must generate returns above those required by the value of tangible assets and financial capital employed. Finally, the business model and industry often also dictate which intangible assets will be created and which will offer the highest return.

The Paper provided a Framework to assess ESG Value Creation Opportunities at Enterprise Level and stated that: "With a better understanding of how E, S, and G investments result in value creation via specific intangible assets and given that intangible asset value drivers are well documented and understood, we can identify certain characteristics to help assess expected relative value creation of ESG investments between enterprises."

The paper identified the following six characteristics to help assess expected value creation of ESG investments between enterprises:

Criteria 1 - Reliance on Brand/Brand Strength

The enhancement and maintenance of ones' brand and reputation appears central to the value proposition of E, S, and G investments. Brand power can generate excess returns between identical products with no more than a name and reputation. As such, the ability to increase one's brand, or maintain an existing brand, is critical to ESG strategy. It would appear that, the greater the reliance on brand and reputation for an enterprise, the greater the ability to create or maintain value through ESG investments.

Criteria 2 - Reliance on Human Capital and Workforce Skill Level

Human Capital is central to intangible asset value creation. Much of the value, and the value generating capacity, in an intangible-driven enterprise resides in its human capital. The cost of failing to attract talent, or losing existing talent and knowhow, are high. It would appear that, the greater the reliance on human capital for an enterprise, the greater the ability to create or maintain value through ESG investments.

⁹ rueger, Corporate goodness and shareholder wealth, Journal of Financial Economics (February 2015): 304-329.

¹⁰ IVSC, Perspectives Paper: A Framework to Assess ESG Value Creation, 26.05.2021, www.ivsc.org/a-framework-to-assess-esg-value-creation, last access 21.07.2022.

Criteria 3 - Premium to Book Value and Value-added Business Model

ESG investment value creation manifests in the formation and/or maintenance of intangible assets. The magnitude of ESG value creation as well as the optimal investment in ESG, are therefore dependent on an enterprise's ability to drive excess economic returns within its industry. It would appear that, the greater the enterprise valuation premium over tangible assets and capital, or the ability to generate enterprise valuation premium, the greater the ability to create or maintain value through ESG investments.

Criteria 4 - Nature of Customer Relationships

E, S, and G investments all have an impact on the formation and maintenance of customer franchise assets. However, assessing how much of an impact requires studying an enterprise's customer base, along with the respective ESG expectations or requirements of those customers. Such analysis is critical to understanding how ESG investments may or may not drive value creation. For enterprises which operate in business to consumer industries, ESG investments provide the opportunity to create value through brand recognition and differentiation as well as through investments in human capital. Alternatively, for enterprises which operate in business-to-business industries, ESG investments may be a requirement imposed by customers as ESG mandates are pushed through their supply chains. An early example of such requirements is Apple's goal to become carbon neutral across its entire value chain by 2030.¹¹ It would appear that, the greater the connection to the end customer, the greater the ability to create or maintain value through ESG investments.

Criteria 5 - Tangible Asset Intensity

Tangible assets have a relatively capped rate of return. On the other hand, ESG investments largely drive additional returns through the formation and maintenance of intangible assets which are scalable. It would appear that, the more a business model relies on tangible assets, the less the potential to create value through ESG investments. However, while tangible assets have relatively fixed returns on the high end, there are significant ESG risks (especially environmental) which could reduce return and degrade value. As such, ESG's role in maintaining value should be considered for both tangible and intangible driven enterprises.

Criteria 6 - Market Dominant Technology

While there is a positive correlation between intangible asset intensity and ESG returns, there are exceptions. For example, propriety technology, especially patented technology, can create consumer demand that is less elastic to the value of other intangible assets. As such, ESG investments may have a lower impact on value creation in these instances. Note that Human Capital is critical to developing technology, but this impact is addressed in Criteria 2. It would appear that, the more a business model relies on proprietary technology, the less the potential to create or maintain value through ESG investments.

The interactive graph (Fig. 1) shown here shows an analysis of these six criteria across five enterprises from different industries, on a scale from 1 to 5. The further away from the centre (e.g., 5), and greater area covered, the greater the expected value creation of ESG investments.





The paper concluded that in the short term, a focus on intangible valuation creation can bring more financial discipline to ESG investments and bolster sustainability reports to go beyond.

lists of statistics and overtly qualitative narratives. Longer term, a focus on intangible value creation can facilitate a move toward a financial reporting system that captures intangible value creation. While the current accounting framework often lacks relevant information on value creation, there are examples in which it is also actively constraining efforts to fully implement value creating ESG priorities.

¹¹ MarketWatch, Apple launches \$200 million forestry fund it says will bring financial return for investors, 16.04.2021, www.marketwatch.com/amp/story/ apple-launches-200-million-forestry-fund-it-says-will-bring-financial-return-for-investors-11618587180, last access 21.07.2022.

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%	MSCI	S&P	Sustainalytics	CDP	ISS	Bloomberg
MSCI		35.7	35.1	16.3	33.0	27.1
S&P	35.7		64.5	35.0	13.9	74.4
Sustainalytics	35.1	64.5		29.3	21.7	58.4
CDP	16.3	35.0	29.3		7.0	44.1
ISS	33.0	13.9	21.7	7.0		21.3
Bloomberg	37.1	74.4	58.4	44.1	21.3	

Table 1: ESG Ratings Comparison: Correlations

VI. Time to Get Tangible About Intangible Assets

In September 2021 the IVSC Business Valuation board published a perspective paper titled Time to Get Tangible About Intangible Assets, which explored the disconnect between market values the unidentified intangible assets values. The paper further states that though there is a strong linkage between ESG considerations and internally generated intangible assets there exists huge disparities in how ESG factors are disclosed and how such information is ultimately incorporated into ESG ratings.¹² The comparison from CFA's article shows the correlations between six different ESG ratings providers for over 400 companies from 24 different industries (Table 1).¹³

These disparities suggest that the ESG ratings, as they stand today, are unable to consistently convey the value creation and preservation opportunities of an enterprise. Rather, we believe the issue requires a standardised principle-based framework incorporated into the current accounting frameworks.

This perspective is further supported in the paper on "Aggregate Confusion: The Divergence of ESG Ratings", which calls for greater transparency amongst rating agencies stating that "First, ESG rating agencies should clearly communicate their definition of ESG performance in terms of scope of attributes and aggregation rules. Second, rating agencies should become much more transparent with regard to their measurement practices and methodologies. Greater methods transparency would allow investors and other stakeholders, such as rated firms, NGOs, and academics, to evaluate and cross-check the agencies' measurements. Also, rating agencies should seek to understand what drives the rater effect to avoid potential biases."¹⁴

This view is shared by the chair of the International Accounting Standards Board who stated that: "the biggest challenge I see is to remain relevant in an ever-changing environment. ... I am thinking of megatrends such as sustainability, and climate change in particular, as well as the rise of self-generated intellectual property and its non-addressal in the accounts, to name but a few. These and further issues are challenges to our work, but they are at the same time opportunities if we are willing to address them with our eyes wide open."¹⁵

VII. ESG and Real Estate Valuation

In October 2021 the IVSC Tangible Assets Board published a perspectives paper on ESG and Real Estate Valuation. The paper states that while it is very frequent to have ESG criteria assessed and measured from a company's perspective, they should also be considered from a tangible asset's perspective as the ESG principles affect not only the behaviour of owners and operators of assets, but also other matters related to the physical properties themselves, such as energy efficiency.¹⁶

Capital markets are increasingly recognizing ESG in their decisions, "with the rapid expansion of Environmental Social Governance (ESG) criteria for investment and the number of ESG funds, 'doing nothing' means the value of your asset – no matter where it is or what type – will likely be impacted by long-term sustainability challenges".¹⁷

Consequently, capital flows will be increasingly channelled into sustainable economic activities in the future meaning ESG will play an important role in corporate decisions.

For insights on how ESG may impact the enterprise value of companies, PricewaterhouseCoopers (PwC) capital markets experts conducted a broad, internal analysis of

¹² IVSC, Perspectives Paper: Time to get Tangible about Intangible Assets, 14.09.2021, www.ivsc.org/time-to-get-tangible-about-intangible-assets, last access 21.07.2022.

¹³ Prall, ESG Ratings: Navigating Through the Haze, CFA Enterprising Investor, 10.08.2021, https://blogs.cfainstitute.org/investor/2021/08/10/esg-ratings-navigating-through-the-haze/, last access 12.09.2022.

¹⁴ Berg/Kölbel/Rigobon, Aggregate Confusion: The Divergence of ESG Ratings (August 15, 2019). Forthcoming Review of Finance, Available at SSRN: https://ssrn.com/abstract=3438533, last access 30.08.2022.

¹⁵ IFRS, Meet the new IASB Chair—Andreas Barckow, 01.07.2021, www.ifrs.org/ news-and-events/news/2021/07/meet-the-new-iasb-chair-andreas-barckow, last access 21.07.2022.

¹⁶ IVSC, Perspectives Paper: ESG and Real Estate Valuation, 14.10.2021, www. ivsc.org/esg-and-real-estate-valuation, last access 21.07.2022.

¹⁷ JLL, Valuing Net Zero and ESG for Offices, JLL Valuation Insights (April 2021).

Article

more than 2,000 companies, to see whether there is a measurable relationship or correlation between a company's ESG rating and its market capitalisation, growth expectation and risk assessment by financial markets.¹⁸ More granular analysis undertaken by PwC as part of this study found that across all sectors, all else equal, companies with a better ESG rating received higher valuations than companies with average ESG ratings.

Across all sectors, it can be seen that companies with a better ESG rating are generally valued higher, more growth-oriented and less risky by the capital market (up to +25%) than companies with a comparatively poorer ESG rating which means valuation discounts were found (up to -10%) - compared to a company with an average ESG rating (Fig. 2).

Figure 2: Value range of market capitalization according to PwC



For the real estate industry, the sample comprised a non-representative number of companies, which are also spread across different areas of the real estate industry (including developers, residential companies).

Although the results for the real estate industry need to be corroborated a by further research due to sample size and scope (different sectors of the real estate industry), the results seem to indicate that ESG has a fundamental impact on the performance or valuation of companies across all sectors including the real estate industry, but the causality is undetermined.

For the real estate industry, the results show that a good ESG rating leads to material valuation premiums. However, the results also show that a poor ESG rating leads to material disadvantages, i.e., companies that do not consider ESG in the real estate industry or have a poor ESG rating expose themselves to significant risks – both operational risks and capital market risks. To dig into the specific impact on real estate assets, we turn to further research in the RICS Sustainability Report published in Q2 2021 showed, as illustrated by the chart in Fig. 3 that "Globally, around half of respondents believe that green/sustainable buildings achieve a rent and a price premium over comparable non-green/sustainable buildings. More than one-third believe that the rent and price premium stands at up to 10%; around 15% judge it to be higher still. Furthermore, over 30% of respondents suggest that, even if there is no rent or price premium, buildings not classed as green or sustainable are subject to a brown discount."

Figure 3: RICS: Rent and price premium for green buildings



As the impact of ESG on companies continues to become clearer, the question has evolved from whether ESG factors impact real estate markets to how we can measure ESG impacts in real estate valuations.

From a real estate perspective, Environmental issues are especially important as the built environment contributes approximately 39% of the world's carbon dioxide emissions and 40% of the energy consumption an increasing number of occupiers, both in the residential and commercial environment, are seeking to occupy buildings with green credentials. Responsible valuers need to be aware of steps taken by governments which will affect real estate.

Within the European Union the EU has committed itself to ESG's and "the 2050 vision is for all buildings (new and existing) to be net zero carbon across the whole lifecycle. As an interim ambition, all new buildings should be able to achieve zero carbon in operations and aim to reduce carbon emissions by 40% in 2030".²⁰

¹⁸ PwC, ESG in der Immobilienbewertung: Ein Diskussionspapier zu Bewertungs- und Ratingmodellen, 15.04.2021, https://pwcplus.de/de/article/223424/ esg-in-der-immobilienbewertung/, last access 21.07.2022.

¹⁹ RICS, World Built Environment Forum Sustainability Report 2021, www. rics.org/de/wbef/home/reports-and-research/sustainability-report-2021, last access 21.07.2022.

²⁰ JLL, Valuing Net Zero and ESG for Offices, JLL Valuation Insights (April 2021).

Similarly, many other governments as well as global corporations are seeking to achieve a net zero position by 2030 through measures such as reducing energy, resource optimisation and switching to renewables with any residual emission being neutralized through carbon offsetting.

In non-EU countries within Europe environmental requirements are still in the early stages of development but as environmental requirements develop within the EU other European countries will face increasing pressure from potential investors and occupiers to meet EU requirements.

In the United Kingdom the precise nature and scope of ESG and related regulation in the UK continues to develop and asper the EU the UK is also committed to meeting net zero requirements. In the UK Energy Performance Certificates (EPCs)are required whenever a property is built, sold, or rented and the government has consulted on further changes and proposed administration. Moreover, UK businesses which maintain access to the EU may opt to comply with the more rigorous governmental expectation should the UK and EU frameworks diverge.

When it comes to valuing real estate, the impact of ESG is not to be found in any white paper or think tank study; it is to be measured from the market and is to reflect the actions of market participants, buyers, sellers, tenants and landlords, developers and lenders. The impact of ESG will evolve over time as both it becomes increasingly more evident in a world-built market and is better understood by those active in the market

Valuers may use one or more of the following three accepted approaches to consider the impacts of ESG in the valuation of real estate:

- Cost Approach
- Market Approach
- Income Approach

In the Cost Approach, the valuer considers the cost to construct the improvements, accrued depreciation and obsolescence and adds in the estimated value of the land. However, cost does not always equal value and while the Cost Approach could be used for part of the valuation to calculate the retrofitting costs to make buildings more ESG compliant, it would not be recommended as the main approach for quantifying ESG considerations within a valuation.

The Market Approach considers prices achieved for transactions of similar properties. At this early stage of market recognition and adoption of ESG practices, there is not yet full transparency regarding ESG characteristics for buildings making it very challenging to find comparable market transactions reflecting full ESG adoption, or to objectively know and compare the level of ESG adoption of the comparables used. This factor makes the Market Approach more difficult to apply for the time being. Nonetheless, it is for the valuer make inquiries to better understand the level of ESG adoption of any comparables used and try to assess the impact of these characteristics in market prices.

In the Income Approach, the valuer estimates the rental income the building can generate, the extent it will be vacant, expenses the landlord will pay for and then the relationship observed in the market between the generation of net income and what price buyers are willing to pay. In the Income Approach, the valuer estimates the rental income the building can generate, the extent it will be vacant, expenses the landlord will pay for and then the relationship observed in the market between the generation of net income and what price buyers are willing to pay.

As both tenants and investors are increasingly sensitive to ESG, they will be increasingly attracted to occupy space in buildings or invest in buildings with higher ESG ratings to improve their own overall ESG rating. It has been further noted that in some instances companies and investors will only consider buildings with sufficient energy performance ratings.

For buildings with better ESG ratings, this may result in higher rents, lower vacancies, and shorter void periods between tenants. To the extent this occurs, this increases the price investors would pay to acquire such real estate.

Discounted Cash Flow Analysis is very well suited to quantifying ESG factors within a real estate valuation because a DCF can explicitly reflect specific assumptions which relate to income, expense, capital expenditures and exit yields and vacancies over a period of years. This method allows the valuer to transparently project expected trends and changes in income and expenses.

Another benefit is that this analysis can be conducted either excluding financing or fully considering financing. This is important as lenders have already become sensitive to ESG and further differences in financing may emerge such as energy efficient mortgages.

In addition, if the valuer already knows the purchase price of the real estate, it would be possible for the valuer to run the cash flow for different scenarios or levels of ESG compliance and solve for the internal rate of return (IRR) which can then be compared against anticipated IRR of other potential investments.

VIII. ESG and DCF's for Real Estate 1. DCF Inputs Income

The influence of ESG on the rent a building can generate can be significant. Many markets, such as the UK have seen that there is a limited supply of appropriately specified ESG buildings, and they are receiving increasing demand from occupiers with ESG requirements. In contrast, buildings which are not seen as ESG compliant and have low, for example, BREEAM, GRESB or LEED ratings are achieving lower rents in many markets. Recent studies from JLL²¹ and Knight Frank²² have directly correlated rental premium to higher BREEAM ratings.

As a result, the valuer needs to have a keen understanding of the market for the real estate asset and understand the extent to which ESG plays into building selection criteria used by occupiers. Valuers must understand the selection criteria used by tenants for the type of building they are valuing and based on those criteria, analyse comparables carefully and make adjustments as needed for the presence or absence of E SG factors.

Non-recoverable operating expenses

In respect of non-recoverable management costs borne by the property owner, these costs should not be significantly different for sustainable buildings. In relation to maintenance costs, several studies suggest that buildings with modern building technology and control systems induce partially higher maintenance costs.²³ On the other hand, more efficient systems will generate savings in operation, therefore for the moment it could be assumed that the overall effect on non-recoverable operating costs is not material. However, in future it could be argued that user behaviour in increasingly complex controlled buildings will influence management costs.

Vacancies

In some markets it appears that in some instances buildings that meet sustainable and ESG criteria may receive higher demand from occupiers and rent more quickly than similar class alternatives that do not meet this criterion. As a result, the valuer will need to carefully consider the vacancy and downtime projections within the cashflows based on the building's competitive position to probable tenants

Capitalisation Rate

The capitalisation rate reflects the risk-return profile of the underlying property, and numerous aspects must be taken into account (location, type of use, occupancy rate, year of construction, tenant-mix, etc.) including the most probable buyer.

As returns are earned in the future, active buyers are forced to be future facing. In some markets investor groups are already targeting ESG compliant buildings as they see these assets as having lower risks in generating income streams, through a higher market rent and a greater occupancy rate as well as higher prices from a potential sale. Therefore, the influence of ESG on the capitalisation rate can be significant. Valuer knowledge of investor preferences is critical.

Discount Rate

As stated in IVS 104 Valuation Approaches and Methods the rate at which the forecast cash flow is discounted should reflect not only the time value of money, but also the risks associated with the type of cash flow and the future operations of the asset. Real estate is frequently valued using discounted cash flows with projections five to ten years or more, so investors active in this space are forced to make forward looking projections. Less sustainable buildings may inherently have a higher discount rate reflecting the risks outlined in relation to potential increased capital expenditure over time, potential additional taxation, longer voids, rental decline and higher exit yields. These associated risks could result in a higher discount in pricing to reflect the increased risk of obsolescence whereas lower discount rates could be applied to more sustainable assets to reflect the increased demand and cheaper debt through preferential financing. The potential difference in discount rates can be shown through scenario testing.²⁴

Terminal Capitalisation Rate

A DCF forecasts cash flows during a holding period and then forecasts the sale of the building to another buyer using a terminal capitalisation rate to estimate the future price of the building in the last year of the cash flow. The terminal capitalisation rate selected reflects the forecasted investment appeal of the building at the end of the forecast period, which is often 10 years. As a result, when performing a DCF, one needs to think both of how a current investor will evaluate the building in the current market, but also how the next buyer will evaluate the building in a future market. Given the increasing importance

²¹ JLL, The impact of sustainability on value: Central London, 27.05.2020, www.jll.co.uk/en/trends-and-insights/research/the-impact-of-sustainability-on-value, last access 21.07.2022.

²² Knight Frank, The Sustainability Series (September 2021), https://content. knightfrank.com/research/2311/documents/en/the-sustainability-series-september-2021-8395.pdf, last access 21.07.2022.

²³ M&G Real Estate, Studies = Responsible Property Investment Report (2018): 4 www.betterbuildingspartnership.co.uk/sites/default/files/media/attachment/MG-RE-RPI%20Report-2018-UK.pdf (last access 02.08.2022); Szumilo/ Fuerst, The Operating Expense Puzzle of US Green Office Buildings (2012), https://papers.srn.com/sol3/papers.cfm?abstract_id=2166028 (last access 02.08.2022)

²⁴ JLL, Valuing Net Zero and ESG for Offices, JLL Valuation Insights (April 2021).

of ESG, less sustainable buildings may have a higher terminal capitalisation rate resulting in a lower forecasted residual value which in turn lowers the current value.

Capital Expenditure:

Refurbishment and retrofitting of buildings are usually conducted after careful analysis because such actions are capital intensive with a return on the expenditure only occurring over several years in the future. Consequently, owners considering such capital expenditures must be forward looking and consider evolving regulatory requirements and forecast future rental incomes based on amenities that could be offered to occupiers. Given the increasing role of ESG considerations, many may decide that it would be financially advantageous to upgrade existing buildings to improve energy efficiencies thereby improving ESG ratings.

There is a potential risk that delaying such a capital expenditure could lead to lost revenue if the building is less attractive to ESG sensitive occupiers and higher operating expenses as energy efficiencies are not realised. There is the potential for future taxation penalising excessive carbon emissions or operational inefficiency within a building.

Therefore, in terms of the cash flow, the question is whether to commit additional costs at the start of a retrofit process to take advantage of the short-term dearth of high rated ESG building sin certain markets, or lower upfront costs, with the anticipation of further significant refurbishment costs over the forecast period, as ESG legislation and market demand becomes more evident in the market.

2. Other Inputs Finance

While many valuations of real estate assets are performed before consideration of financing, there are an increasing number of green loans available within markets where lower finance costs are offered to buildings where sustainability Key Performance Indicators are achieved. This results in lower costs of debt and enhanced equity returns to the property owner.

Useful Life

In some markets such as the Netherlands, there is a legal restriction on the useful life of buildings that don't meet certain ESG compliant criteria. The valuer must be aware of this and consider the relevant legislation in the locality and when appropriate. In doing so, they must restrict the forecast cashflows to the remaining useful life of the building, or until the building is made more ESG compliant.

In order to account for ESG factors within the valuation process the IVSC anticipate that the valuer will need to:

- Monitor the continued evolution of ESG and what building aspects result in higher or lower ESG ratings.
- When evaluating a building in its market, be aware of applicable governmental ESG measures.
- Maintain a keen understanding of leasing and other market requirements to accurately reflect supply and demand considering ESG.
- Liaise with construction and build cost professionals to understand components that enhance ESG factors and their cost.
- Understand ESG features of comparables used and determine how much emphasis market participants place on such features.
- Understand whether favourable financing is available for buildings with a higher ESG rating.

IX. ESG Survey

In January of this year the IVSC Standards Review Board issued a survey on ESG and valuation, as the SRB felt they that it was important to carry out a survey of investors, businesses, and valuers to understand where they are in their journey towards the quantification of ESG components within their valuations. Furthermore, the SRB felt that gathering data via a survey was particularly important as the role of standard setters is not to lead the market but to develop standards to meet market needs.

The ESG survey, which relates to all types of valuations including valuations for financial reporting, market capitalisations, secured lending and tax reporting purposes, closed on the 30th of April 2020. The detailed results of this survey will be contained in a perspectives paper due to be published in the second half of this year but some of the key findings of this survey are as follows:

- No consistent framework and/or standards used by firms, investors, or valuation providers. This could lead to a lack of transparency and consistency and illustrates the need for a globally consistent approach.
- Regulators have a large role to play in shaping firms ESG policies.
- 54% of firms are unable to quantitively estimate the impacts of any ESG factors as part of their budgeting forecast. This could have implications for the work currently being undertaken by the ISSB.
- Most firms (see social factors as being the most important factors to consider for ESG in the medium term (12 to 36 months) with Environmental and Governance being seen more as long-term factors (36 months plus) for consideration. This is largely because they see social factors as more material to the valuation of their business.
- Most valuation providers think that IVSC should include more explicit standards around ESG considerations.

The IVSC is planning to produce the ESG survey on an annual basis so it can monitor the progress made by firms, investors, and valuation providers in relation to the consideration and quantification of ESG and ESG components within the valuation process.

X. Conclusion

In conclusion the IVSC Standards Review Board and its Technical Boards have made significant strides in unlocking the value of ESG though there is still a long way to go in the journey. The IVSC Business Valuation Board will continue to explore the linkage between ESG considerations and internally generated intangible assets and have recently published the next perspective paper in the series on internally generated intangibles on Human Capital²⁵ and further perspective papers will follow later this year. The IVSC will continue to issue ESG related perspectives papers during 2022 to further explore the consideration of ESG and its components within the valuation process and to act as a precursor to more explicit ESG requirements in the next edition of IVS to ensure consistency and transparency in the consideration of ESG within the valuation process. •

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Business Valuation is an increasingly important area of work, particularly when considering the relevance of high value intangible assets typically not listed on the balance sheet, and the increasing focus on ESG disclosures and the impact these are likely to have on the value of a business. IVSC is delighted to be partnering with EACVA to create this publication aimed at helping European Business Valuation professionals share practical knowledge and insights relevant to Europe. We hope you will enjoy and find it useful."

Nick Talbot, Chief Executive Officer IVSC

²⁵ IVSC, Perspectives Paper: Human Capital, 31.05.2022, www.ivsc.org/perspectives-paper-human-capital, last access 21.07.2022.

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Industry Betas and Multiples



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General

To derive the provided betas and multiples, only companies from the Eurozone have been considered, namely Spain, Slovenia, Slovakia, Portugal, Netherlands, Monaco, Malta, Luxembourg, Lithuania, Latvia, Italy, Ireland, Greece, Germany, France, Finland, Estonia, Cyprus, Belgium, Austria. The included companies have been grouped on industry-level, as well as on subindustry level based on the Global Industry Classification Standard (GICS). For each edition of the journal, aggregates for all eleven main industries and one individually selected subindustry will be shown. Due to the special characteristics of companies operating in the financial industry (high leverage, high dependency on the interest level, etc.) we only provide levered betas for that industry. Also, note that the trading multiples may be skewed and hence of limited validity.

The underlying data has been obtained from S&P at the beginning of August 2022. All presented values are based on raw data and raw calculations. They have carefully been checked and evaluated but have not been audited nor have individual values been verified. Certain results may be misleading in your setup or specific context. All results should be critically evaluated and interpreted. The data and usage are on your own risk.

Eurozone Cost of Capital Parameters as at 31 July 2022

The typified, uniform risk-free rate based on AAA-rated government bonds currently lies at 1.25% for the Eurozone. It is derived from yield curves based on Svensson parameters and results published by the European Central Bank. The overall long-term market return for the Eurozone is estimated at around 8.5%, leading to a market risk premium of 7.25%. Estimations of the market return rely on historical returns as well as on forward-looking return estimates and risk premiums based on Eurozone companies with current market share prices and earnings forecasts from financial analysts.

Betas

Levered, debt and unlevered betas are calculated over an observation period of a single five-year period (monthly returns) as well as on five one-year periods (weekly returns). The provided unlevered betas rely on raw levered betas, uncertain tax shields, and including debt betas.

Raw levered betas are obtained from a standard OLS regression with stock returns being the dependent and stock market index returns (S&P Eurozone BMI Index) being the independent variable. Stock and index returns are total returns, thus including dividends, stock splits, rights-issues, etc. (if available). Levered betas below zero and above three are treated as outliers.

Unlevered betas have been estimated based on Harris-Pringle, assuming uncertain tax shields and including debt beta:

$$\beta_u = \beta_L \frac{E}{E+D} + \beta_D \frac{D}{E+D},$$

where β_u = unlevered beta, β_d = debt beta, D = Net Debt, E = Market Value of Equity. Debt Betas rely on a company's individual rating on a given date. Annual rating-specific levels of debt betas are extracted from a broad market analysis. Net Debt includes Total debt (incl. lease liabilities¹) + net pensions + minority interest + total preferred equity - total cash - short term investments.

In accordance with the observation period, parameter averages of debt beta, net debt and market equity over the individual periods are applied when unlevering levered betas. Unlevered betas below zero and above two are treated as outliers.

¹ After the adoption of IFRS 16, reported total debt might now also include operating lease liabilities, which were not considered in prior years. For years before the adoption of IFRS 16, we include discounted estimates for operating lease liabilities based on reported operating lease liability payments in order to align the total debt estimations.



Table 1: Average Levered Industry Betas for five single 1y-periods and one 5y-period

31.07.2022	Average* Levered Betas												
			1-Ye	ar, weekly reti	urns			5-Year, mon	thly returns				
Industries	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022				
Industrials	240	0.95	1.17	1.02	1.02	0.85	1.00	222	1.18				
Consumer Discretionary	147	0.83	1.04	1.05	1.00	1.05	0.99	132	1.26				
Health Care	119	0.96	1.05	0.72	0.81	0.72	0.85	109	0.83				
Financials	138	0.82	0.98	1.02	1.10	0.98	0.98	125	1.18				
Utilities	48	0.77	0.54	0.81	0.79	0.60	0.70	44	0.68				
Materials	77	0.93	1.27	1.05	1.02	0.84	1.02	71	1.21				
Real Estate	86	0.57	0.46	0.78	0.72	0.59	0.62	75	0.81				
Communication Services	86	1.00	0.86	0.81	0.79	0.63	0.82	76	0.84				
Information Technology	143	1.04	1.22	0.87	0.86	0.89	0.98	131	1.10				
Consumer Staples	56	0.67	0.67	0.62	0.60	0.67	0.65	52	0.67				
Energy	33	0.97	1.07	1.02	1.23	0.51	0.96	31	1.10				

Table 2: Average Industry Leverage for five single 1y-periods and one 5y-period

31.07.2022				Avera	age* Debt-Equ	uity-Ratios			
				1-Year				5-Y	ear
Industries	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022
Industrials	127	64.1%	78.2%	117.5%	56.4%	56.6%	74.6%	184	58.8%
Consumer Discretionary	67	87.9%	164.7%	154.6%	88.6%	123.9%	124.0%	112	84.4%
Health Care	47	21.0%	30.4%	19.3%	20.6%	79.9%	34.2%	73	20.5%
Utilities	30	111.9%	98.8%	89.9%	70.8%	74.0%	89.1%	37	81.2%
Materials	47	52.8%	63.3%	87.4%	40.6%	49.1%	58.6%	60	48.1%
Real Estate	37	100.1%	99.5%	137.7%	125.4%	158.5%	124.2%	54	106.1%
Communication Services	40	102.4%	86.4%	349.5%	312.4%	75.9%	185.3%	56	70.3%
Information Technology	64	18.1%	24.2%	46.7%	11.7%	21.3%	24.4%	99	13.4%
Consumer Staples	36	155.2%	261.4%	194.9%	196.9%	294.9%	220.7%	42	168.5%
Energy	21	103.8%	118.0%	447.3%	333.5%	78.8%	216.3%	26	97.7%

Table 3: Average Unlevered Industry Betas for five single 1y-periods and one 5y-period

31.07.2022				Avera	age* Unlevere	d Betas				
			1-Ye	ar, weekly retı	urns			5-Year, monthly returns		
Industries	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022	
Industrials	127	0.83	0.95	0.88	0.88	0.76	0.86	184	0.94	
Consumer Discretionary	67	0.75	0.85	0.89	0.87	0.88	0.85	112	1.00	
Health Care	47	0.91	0.88	0.68	0.66	0.72	0.77	73	0.78	
Utilities	30	0.60	0.48	0.64	0.62	0.45	0.56	37	0.51	
Materials	47	0.79	0.96	0.80	0.81	0.72	0.81	60	0.94	
Real Estate	37	0.51	0.45	0.66	0.54	0.51	0.53	54	0.65	
Communication Services	40	0.73	0.74	0.67	0.65	0.63	0.68	56	0.71	
Information Technology	64	0.98	1.20	1.00	0.87	0.91	0.99	99	1.06	
Consumer Staples	36	0.54	0.61	0.60	0.54	0.61	0.58	42	0.55	
Energy	21	0.84	1.01	1.00	1.02	0.49	0.87	26	1.00	

*Average = Arithmetic Mean

Table 1: Average Levered Subindustry (Industrials) Betas for five single 1y-periods and one 5y-period

31.07.2022		Average* Levered Betas												
			1-Yea	ar, weekly reti	urns			5-Year, mon	thly returns					
Subindustry: Industrials	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022					
Aerospace & Defense	13	1.25	1.25	1.20	1.39	0.63	1.14	12	1.32					
Air Freight & Logistics	9	0.76	1.00	0.66	0.64	0.77	0.77	9	0.83					
Airlines	6	0.92	0.97	1.36	1.58	1.33	1.23	6	1.71					
Building Products	13	0.81	0.96	0.85	0.66	0.83	0.82	12	0.97					
Commercial Services & Supplies	22	0.96	1.10	1.07	1.05	0.80	0.99	21	1.22					
Construction & Engineering	32	1.03	1.36	1.09	1.10	0.84	1.08	29	1.30					
Electrical Equipment	24	0.98	1.30	0.95	1.16	0.79	1.04	20	1.18					
Industrial Conglomerates	9	0.97	1.00	0.98	0.82	0.79	0.91	8	1.11					
Machinery	65	0.92	1.21	0.95	0.91	0.94	0.99	61	1.17					
Marine	5	0.75	1.39	1.08	1.55	0.66	1.09	5	1.14					
Professional Services	17	0.86	1.03	1.07	0.97	0.88	0.96	17	1.10					
Road & Rail	4	1.35	1.57	1.35	1.24	0.67	1.24	3	1.16					
Trading Companies & Distributors	11	0.85	1.12	1.21	0.93	0.86	0.99	10	1.19					
Transportation Infrastructure	11	0.92	0.72	1.15	1.11	0.73	0.93	9	1.10					

Table 2: Average Subindustry (Industrials) Leverage for five single 1y-periods and one 5y-period

31.07.2022		Average* Debt-Equity-Ratios												
				1-Year				5-Y	ear					
Subindustry: Industrials	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022					
Aerospace & Defense	7	22.7%	20.6%	42.3%	51.6%	19.0%	31.2%	11	26.7%					
Air Freight & Logistics	2	46.4%	29.3%	38.0%	9.3%	16.2%	27.8%	7	28.5%					
Airlines	3	124.4%	91.5%	285.5%	205.0%	183.6%	178.0%	5	162.6%					
Building Products	5	42.0%	48.3%	34.9%	15.2%	19.4%	31.9%	9	29.3%					
Commercial Services & Supplies	12	55.6%	77.4%	110.7%	73.9%	89.9%	81.5%	16	68.1%					
Construction & Engineering	17	150.0%	163.4%	284.7%	108.9%	98.7%	161.1%	25	117.8%					
Electrical Equipment	13	38.1%	37.3%	36.0%	21.4%	17.4%	30.0%	18	29.7%					
Industrial Conglomerates	3	20.9%	29.6%	40.7%	24.9%	33.5%	29.9%	7	24.5%					
Machinery	33	26.0%	46.9%	60.3%	29.4%	38.2%	40.2%	48	31.3%					
Marine	2	106.4%	155.6%	247.7%	81.3%	64.2%	131.0%	5	109.7%					
Professional Services	13	23.0%	24.0%	26.8%	15.1%	17.4%	21.3%	15	18.6%					
Road & Rail	3	253.1%	391.7%	772.5%	195.8%	214.5%	365.5%	2	228.2%					
Trading Companies & Distributors	6	147.8%	194.7%	257.9%	122.6%	128.3%	170.3%	8	138.0%					
Transportation Infrastructure	8	62.2%	73.8%	132.2%	96.4%	88.3%	90.6%	8	70.7%					

Table 3: Average Unlevered Subindustry (Industrials) Betas for five single 1y-periods and one 5y-period

31.07.2022				Averag	e* Unlevered	Betas			
			1-Ye	ar, weekly ret	urns			5-Year, mon	thly returns
Subindustry: Industrials	Comps incl. (Average*)	8/2017 to 7/2018	8/2018 to 7/2019	8/2019 to 7/2020	8/2020 to 7/2021	8/2021 to 7/2022	Average*	Comps incl.	8/2017 to 7/2022
Aerospace & Defense	7	1.09	1.16	1.01	1.22	0.55	1.01	11	1.11
Air Freight & Logistics	2	0.67	0.93	0.51	0.34	0.57	0.60	7	0.70
Airlines	3	0.69	0.77	1.01	1.21	0.96	0.93	5	1.14
Building Products	5	0.72	0.76	0.76	0.80	0.78	0.76	9	0.84
Commercial Services & Supplies	12	0.80	0.82	0.84	0.82	0.70	0.80	16	0.88
Construction & Engineering	17	0.85	0.98	0.92	0.93	0.80	0.89	25	0.89
Electrical Equipment	13	0.80	1.06	0.93	0.93	0.76	0.89	18	1.05
Industrial Conglomerates	3	1.23	1.03	1.00	0.83	0.65	0.94	7	0.89
Machinery	33	0.90	1.12	0.89	0.86	0.85	0.92	48	0.99
Marine	2	0.52	0.77	0.76	1.16	0.61	0.76	5	0.74
Professional Services	13	0.78	0.95	0.96	0.83	0.81	0.87	15	0.99
Road & Rail	3	0.86	0.92	0.73	0.66	0.65	0.76	2	0.95
Trading Companies & Distributors	6	0.72	0.79	0.77	0.72	0.74	0.74	8	0.91
Transportation Infrastructure	8	0.66	0.50	0.75	0.78	0.54	0.65	8	0.79

*Average = Arithmetic Mean

Multiples

Multiples are computed based on actuals (based on the annual report) and forecasts (based on estimates by analyst) for the trailing year and the forward +1 year. Trading multiples for Sales, EBITDA and EBIT are each derived by dividing a companies' enterprise value (market capitalization plus net debt) by its sales, EBITDA or EBIT. Earnings multiples are derived by dividing a companies' market capitalization by earnings (net income). The book-tomarket ratio is derived by dividing a companies' book value of equity by its market value of equity. Multiples below zero and above 500 are treated as outliers. •

Table 1: Average Industry Multiples

31.07.2022		Sales		EBITDA			EBIT			Earnings			Market to Book-Ratio		
Industries	Trai- ling	Fwd. +1	Comps incl.	Trai- ling	Fwd. +1	Comps incl.									
Industrials	1.8	1.5	222	9.7	8.0	200	17.4	14.0	213	21.0	18.2	206	2.8	2.6	203
Consumer Discretionary	2.5	2.3	134	13.2	8.2	111	17.5	14.5	124	26.5	14.8	124	2.8	2.6	124
Health Care	8.3	5.7	107	11.6	13.4	72	25.8	18.2	79	26.4	28.0	73	3.7	3.4	83
Financials	9.1	8.7	89	12.2	11.3	30	21.7	15.6	82	12.7	10.5	109	1.0	1.0	105
Utilities	5.1	4.6	43	11.1	9.5	42	19.7	16.8	43	24.0	19.0	42	2.6	2.3	42
Materials	2.6	1.7	73	6.6	6.5	65	11.8	10.2	71	10.6	10.7	69	1.7	1.5	64
Real Estate	14.2	12.8	68	23.8	22.4	62	23.7	22.9	68	14.3	12.5	67	0.8	0.8	60
Communication Services	2.3	2.1	72	7.4	10.1	65	19.6	14.9	68	15.5	19.9	65	2.4	2.2	64
Information Technology	2.8	2.2	131	13.8	11.0	105	22.3	15.4	116	26.8	23.7	111	4.8	4.0	111
Consumer Staples	1.6	1.5	55	11.1	11.2	40	16.6	15.2	54	22.5	15.7	54	2.2	2.1	50
Energy	2.2	1.9	29	7.1	5.9	27	17.9	10.3	28	16.6	14.7	29	2.1	1.7	26

Table 2: Average Subindustry (Industrials) Multiples

31.07.2022	Sales			EBITDA			EBIT			Earnings			Market to Book		
Subindustry: Industrials	Trai- ling	Fwd. +1	Comps incl.	Trai- ling	Fwd. +1	Comps incl.									
Aerospace & Defense	2.5	1.3	15	10.2	8.8	14	17.3	13.2	13	22.2	15.8	13	3.0	4.1	15
Air Freight & Logistics	0.7	0.7	9	4.9	4.4	8	8.8	7.8	9	13.4	12.7	9	5.3	3.4	9
Airlines	0.9	0.8	6	11.2	5.0	5	36.3	34.7	6	13.5	13.0	5	3.7	2.9	5
Building Products	1.8	1.7	11	10.0	9.5	10	14.6	13.4	11	19.0	16.3	11	3.3	2.9	10
Commercial Services & Supplies	1.0	0.9	20	6.5	5.6	17	11.9	12.5	20	12.2	10.1	16	2.3	2.0	18
Construction & Engineering	0.9	0.9	26	6.7	6.0	25	11.4	10.0	24	22.7	14.3	25	1.6	1.5	23
Electrical Equipment	2.4	2.0	24	21.3	13.1	20	42.8	21.3	22	40.0	58.2	21	4.4	3.8	23
Industrial Conglome- rates	1.1	1.0	8	7.5	6.4	6	12.7	10.4	8	20.8	14.9	8	1.3	1.2	6
Machinery	1.4	1.1	60	8.3	7.5	54	13.2	12.5	57	19.3	12.2	56	2.4	2.3	52
Marine	2.6	2.9	5	3.8	5.4	5	4.8	6.9	5	3.8	5.8	5	1.3	1.4	4
Professional Services	2.6	2.4	17	10.1	9.2	14	14.8	13.0	16	17.5	15.8	16	3.6	3.3	17
Road & Rail	2.0	1.9	4	12.3	11.9	4	30.3	23.6	4	22.7	14.8	4	1.5	1.4	4
Trading Companies & Distributors	1.8	1.7	8	8.5	8.9	8	11.9	13.3	8	10.7	12.8	8	1.7	1.6	8
Transportation Infrastructure	5.6	5.0	9	12.8	10.3	10	25.3	18.2	10	38.1	21.9	9	2.6	2.4	9

*Average = Arithmetic Mean

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Transaction Multiples



Data

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The computations of the transaction multiples are based on the transaction and company data of various M&A databases, with the data being driven to consistency.

We publish transaction multiples for Europe and resulting regression parameters (including transactions of the period *1 July 2019 until 30 June 2022*) for the following multiples:

- Deal Enterprise Value/Sales,
- Deal Enterprise Value/EBITDA
- Deal Enterprise Value/EBIT
- Deal Enterprise Value/Invested Capital

The multiples in this issue cover Europe as a total. In the following issues we will provide a regional split into:

- Central and Western Europe, Southern Europe
- Scandinavia und Britain
- Eastern Europe

When using the data (multiples and regression), please consider the following:

- Sectors and resulting sector multiples are formed according to the NACE Rev. 2 industry classification system.
- The multiples indicate the Deal Enterprise Value (DEPV = Market value of total capital corrected) for a private firm. They are scaled to the levels of value Control Value, Pure Play Value and Domestic Value. Additionally, the multiples do not include any identifiable Synergistic Values. When applying the multiples to other levels of value without adjusting the value driver (reference value), respective Valuation Adjustments (Minority Discount for Minority Values, Conglomerate Discount for Conglomerates, Regional Premiums for Cross-Border transactions by international acquirors and Strategic Premium for Synergistic acquisitions) must be applied.

- The multiples are computed using transaction data collected from the previous three years. Therefore, the available multiples include transactions of the period *1 July 2019 until 30 June 2022*, with the transactions during the *latest six months given double weight*.
- The reliability of the recorded transaction data and the resulting multiples was analyzed according to the fraction of the transacted share, low and high values of the value driver as well as up-side and down-side percentiles of the observations on multiples; identified outliers were eliminated.
- Trailing multiples are computed employing the value driver available closest to date of the transaction. Forward multiples are computed using mean and/ or median estimates for the forthcoming three to six years after the transaction (not available for Invested Capital).
- The EBITDA multiples and the EBIT multiples are based on companies with only a positive EBITDA or EBIT at date of the transaction.
- The regression assumes a linear relationship between the value driver and the Deal Enterprise Value. Furthermore, it is assumed that the observed Deal Enterprise Values as well as the respective value drivers show no trend over time, making them ready for a cross-section analysis. The error terms are assumed to be normally distributed, having constant variances (homoskedasticity), being independent (no autocorrelation) and showing an expected value of zero.
- The range of the multiples (confidence interval) applies a 95% confidence level, assuming the observed multiples to be normally distributed (after elimination of outliers).
- Sectors with less than 20 observations were ignored.
- The various regions are compounded as follows: Central and Western Europe: Andorra, Austria, Belgium, Germany, France, Liechtenstein, Luxembourg, Monaco, The Netherlands, Switzerland
 Southern Europe: Croatia, Cyprus, Gibraltar, Greece, Italy, Malta, Portugal, San Marino, Slovenia, Spain, Turkey

Scandinavia: Denmark, Finland, Iceland, Norway, Sweden Britain: Ireland, United Kingdom

Eastern Europe: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kosovo, Latvia, Lithuania, Moldova, Montenegro, North Makedonia, Poland, Romania, Russia, Serbia, Slovakia, Ukraine.

The data is evaluated carefully; however, the author denies liability for the accuracy of all computations.

Application notes:

n indicates the number of observations (sample size) included in both, the computation of the multiples and the regression. \bar{x}_a indicates the arithmetic mean, \bar{x}_h indicates the harmonic mean

$$\left(\,\bar{x}_h\,=\,\frac{n}{\sum_{i=1}^n\frac{n}{x_i}}\right),\,$$

and \bar{x}_t indicates the truncated mean (10% level = 10% of the observations sorted in ascending order being eliminated up-side and down-side;

$$\bar{x}_t = \frac{\sum_{2}^{n-1} x_i}{n-2}.$$

The first quartile Q_1 indicates the boundary of the lowest 25%, the third quartile Q_3 indicates the boundary of the highest 25% of the observed multiples. Using this information, the actually employed multiple may be related to the group of the 25% lowest (highest) multiples observed. Q_2 indicates the median of the observed multiples. The confidence interval reports the range (lower confidence limit to upper confidence limit) of the multiples applying a 95% confidence level. Assuming the multiples observed to be normally distributed, this indicates all multiples lying within these limits. To evaluate the assumption of normally distributed multiple observations, the results of the Jarque-Bera Test for Normality are reported in brackets

$$JB = n \left[\frac{(skewness)^2}{6} + \frac{(kurtosis-3)^2}{24} \right]_{j;}$$

values above the reported 5% significance points reject the null hypothesis of normality, indicating the confidence interval to be less reliable:

n	5%	n	5%	n	5%	n	5%
100	4,29	200	4,43	400	4,74	800	5,46
150	4,39	300	4,6	500	4,82	∞	5,99

The skewness sk indicates the symmetry of the distribution of multiple observations. A negative skewness indicates the distribution to be skewed to the left, whereas a positive skewness indicates the distribution to be skewed to the right (a skewness of zero indicates the distribution to be symmetric). The coefficient of variation indicates the dispersion of the observed multiples adjusting for the scale of units in the multiples, expressed by the standard deviation as a percentage of the mean. It allows for a comparison of the dispersion of the multiples across sectors. A lower (higher) coefficient of variation indicates a lower (higher) dispersion of the observed multiples and, similarly, a higher (lower) reliability of the sector multiples.

The (linear) regression equation allows for computing the Deal Enterprise Value of a private firm directly from the observed transactions (without using a multiple). Disregarding the error term, it consists of a slope expressed in terms of the value driver employed and a constant (intercept) (\hat{y} =DEPV= slope x value driver+ constant (+ error term)). The reliability of the regression equation (goodness of fit) is indicated by the adjusted coefficient of determination

$$(\bar{R}^2 = 1 - (1 - R^2)\frac{n-1}{n-p})$$

with p = the number explaining variables + 1 = 1 + 1 = 2; being sensitive to the number of observations), indicating the variability of the observed multiples that is explained by the regression equation. Unlike the (unadjusted) coefficient of determination, the adjusted coefficient of determination is not limited to the range between zero and one. A higher (lower) coefficient indicates a better (poorer) regression. The standard error of the regression equation similarly indicates the goodness of fit of the regression equation, indicating the degree of similarity between the regression residuals (error terms) and the "true" residuals. A lower (higher) standard error indicates a better (poorer) regression. •

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	408
В	05 - 09	Mining and quarrying	3,478
CA	10 - 12	Manufacture of food products, beverages, tobacco products	1,283
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	2,018
СС	16 - 18	Manufacture of wood/products, paper/products, printing	741
CD	19	Manufacture of coke and refined petroleum products	166
CE	20	Manufacture of chemicals and chemical products	2,168
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	564
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	1,481
СН	24 - 25	Manufacture of basic metals, fabricated metal products	3,644
CI	26	Manufacture of computer, electronic and optical products	3,301
CJ	27	Manufacture of electrical equipment	2,056
CK	28	Manufacture of machinery and equipment	2,850
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	1,358
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	2,007
D	35	Electricity, gas, steam and air conditioning supply	1,267
E	36 - 39	Water supply, sewerage, waste management, remediation activities	462
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	3,360
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	6,746
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	4,074
I	55 - 56	Accommodation and food/beverage service activities	623
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	4,481
JB	61	Telecommunications	1,508
JC	62 - 63	Computer programming/consultancy, information service activities	5,947
К	64 - 66	Financial and insurance activities	1,776
L	68	Real estate activities	564
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	3,703
MB	72	Scientific research and development	794
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	451
N	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	2,029
Ρ	85	Education	290
Q	86 - 88	Human health and social work activities	778
R	90 - 93	Arts, entertainment and recreation	515
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	252

			Trailing [DEPV/Sa	les (ope	rating) Multiples			Trailing Sales (operating	g) Regres	sion
Ха	Χ̈́h	Χt	Q ₁	Q ₂	Q ₃	95% (JB)	sk	cv	ŷ = DEPV (TEUR)	\overline{R}^2	sey
0.93	0.14	0.85	0.26	0.72	1.62	[0.78; 1.07] (48.3)	0.72	0.86	ŷ = 0.166 x Sales + 75,141	0.17	221,509
1.45	0.77	1.45	0.89	1.42	2.05	[1.40; 1.49] (434.3)	-0.05	0.51	ŷ = 0.955 x Sales + 1,708,069	0.85	7,836,211
1.02	0.29	0.95	0.34	0.91	1.56	[0.95;1.09](141.6)	0.67	0.73	ŷ = 0.990 x Sales + 447,633	0.75	2,552,023
1.61	0.93	1.62	0.88	1.69	2.20	[1.55; 1.67] (267.7)	-0.24	0.49	ŷ = 1.070 x Sales + 907,550	0.51	1,248,484
0.88	0.30	0.77	0.29	0.67	1.06	[0.78;0.98] (69.4)	1.22	0.87	ŷ = 1.086 x Sales + 13,457	0.95	457,508
0.93	0.35	0.90	0.57	0.90	1.35	[0.81;1.05](18.6)	0.16	0.62	ŷ = 0.908 x Sales - 313,520	0.99	3,431,066
1.53	0.21	1.53	1.01	1.59	2.06	[1.47; 1.58] (233.2)	-0.05	0.49	ŷ = 1.622 x Sales + 77,658	0.79	3,117,171
1.52	0.58	1.53	0.89	1.48	2.31	[1.38; 1.67] (74.2)	-0.03	0.57	ŷ = 2.662 x Sales - 227,709	0.97	1,325,179
0.99	0.30	0.90	0.36	0.76	1.53	[0.92 ; 1.07] (150.8)	0.88	0.79	ŷ = 1.500 x Sales - 50,460	0.86	2,085,098
1.22	0.16	1.17	0.56	1.12	1.91	[1.18; 1.27] (465.3)	0.43	0.63	ŷ = 0.340 x Sales + 926,484	0.52	1,847,170
1.24	0.58	1.18	0.56	1.15	1.81	[1.20; 1.29] (372.8)	0.59	0.61	ŷ = 1.498 x Sales - 869,658	0.78	3,127,185
0.88	0.56	0.84	0.50	0.84	1.15	[0.86;0.90] (92.4)	1.16	0.53	ŷ = 1.685 x Sales - 2,828,058	0.82	3,468,962
0.99	0.54	0.91	0.54	0.89	1.24	[0.95; 1.02] (206.4)	1.08	0.65	ŷ = 0.787 x Sales + 421,471	0.78	1,567,674
0.95	0.08	0.87	0.46	0.70	1.38	[0.89; 1.00] (132.4)	0.84	0.71	ŷ = 0.581 x Sales + 3,646,454	0.51	19,102,210
1.61	0.31	1.66	0.70	1.96	2.41	[1.53 ; 1.70] (299.7)	-0.41	0.56	ŷ = 0.696 x Sales + 1,382,893	0.61	1,581,225
0.90	0.18	0.80	0.27	0.76	1.28	[0.83;0.97] (103.3)	0.94	0.82	ŷ = 1.212 × Sales + 113,226	0.95	4,440,662
1.22	0.52	1.15	0.41	0.91	1.91	[1.05 ; 1.39] (58.6)	0.66	0.74	ŷ = 0.622 x Sales + 867,162	0.49	2,199,254
0.68	0.12	0.57	0.16	0.43	1.05	[0.64;0.71] (248.4)	1.34	0.98	ŷ = 0.127 x Sales + 399,858	0.09	929,449
1.01	0.10	0.94	0.31	0.69	1.82	[0.97; 1.05] (901.6)	0.64	0.82	ŷ = 0.833 x Sales + 402,590	0.89	3,383,797
0.96	0.40	0.87	0.52	0.66	1.33	[0.92 ; 1.00] (456.0)	1.08	0.77	ŷ = 0.627 x Sales + 860,601	0.49	3,471,646
1.61	0.78	1.64	0.92	1.74	2.36	[1.48; 1.73] (86.3)	-0.19	0.52	ŷ = 2.042 x Sales + 23,712	0.87	580,783
1.41	0.35	1.40	0.70	1.39	2.11	[1.37 ; 1.46] (593.7)	0.10	0.59	ŷ = 1.758 x Sales + 177,895	0.95	2,202,727
1.76	0.85	1.82	1.32	1.92	2.51	[1.69; 1.83] (165.3)	-0.53	0.44	ŷ = 1.478 x Sales + 2,400,190	0.94	3,256,732
1.34	0.37	1.32	0.62	1.22	2.05	[1.30; 1.39] (808.7)	0.26	0.63	ŷ = 2.088 x Sales + 6,408	0.92	1,203,403
1.21	0.21	1.17	0.46	1.08	1.87	[1.13; 1.29] (247.5)	0.31	0.70	ŷ = 0.634 x Sales - 54,573	0.89	1,887,733
1.30	0.57	1.28	0.72	1.21	2.03	[1.19; 1.42] (69.0)	0.24	0.59	ŷ = 0.979 x Sales + 38,034	0.82	207,620
1.08	0.33	1.01	0.37	0.78	1.68	[1.03; 1.14] (473.0)	0.69	0.78	ŷ = 0.314 x Sales + 722,180	0.53	1,438,704
1.43	0.29	1.42	0.81	1.34	2.05	[1.33; 1.53] (95.8)	0.20	0.54	ŷ = 2.133 x Sales + 25,028	0.96	684,805
0.88	0.23	0.80	0.26	0.67	1.36	[0.77; 1.00] (49.9)	0.81	0.84	ŷ = 1.658 x Sales - 9,929	0.93	189,473
0.87	0.17	0.77	0.22	0.46	1.58	[0.80;0.95] (238.6)	0.90	0.95	ŷ = 0.308 x Sales + 240,131	0.83	978,754
1.00	0.29	0.96	0.38	0.81	1.58	[0.87; 1.14] (36.9)	0.48	0.71	ŷ = 0.651 x Sales + 21,483	0.60	416,257
1.28	0.29	1.28	0.64	1.36	1.75	[1.20 ; 1.35] (81.2)	-0.14	0.53	ŷ = 1.623 x Sales - 55,368	0.97	497,199
1.19	0.33	1.13	0.49	1.08	1.65	[1.06 ; 1.32] (58.6)	0.53	0.68	ŷ = 1.454 x Sales - 8,160	0.88	232,017
1.04	0.39	0.98	0.22	0.65	1.89	[0.81;1.26](38.8)	0.61	0.86	ŷ = 0.166 x Sales + 338,034	0.79	411,160

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	376
В	05 - 09	Mining and quarrying	6,231
CA	10 - 12	Manufacture of food products, beverages, tobacco products	912
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	3,059
СС	16 - 18	Manufacture of wood/products, paper/products, printing	1,288
CD	19	Manufacture of coke and refined petroleum products	762
CE	20	Manufacture of chemicals and chemical products	5,045
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	977
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	4,138
СН	24 - 25	Manufacture of basic metals, fabricated metal products	6,183
CI	26	Manufacture of computer, electronic and optical products	6,210
CJ	27	Manufacture of electrical equipment	2,630
СК	28	Manufacture of machinery and equipment	7,782
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	4,879
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	3,816
D	35	Electricity, gas, steam and air conditioning supply	2,694
E	36 - 39	Water supply, sewerage, waste management, remediation activities	1,057
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	5,818
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	9,891
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	5,818
Ι	55 - 56	Accommodation and food/beverage service activities	2,211
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	6,075
JB	61	Telecommunications	1,760
JC	62 - 63	Computer programming/consultancy, information service activities	11,298
K	64 - 66	Financial and insurance activities	1,632
L	68	Real estate activities	542
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	6,215
MB	72	Scientific research and development	1,712
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	322
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	4,777
Ρ	85	Education	488
Q	86 - 88	Human health and social work activities	1,079
R	90 - 93	Arts, entertainment and recreation	456
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	360

	Forward DEPV/Sales (operating) Multiples								Forward Sales (operatin	ssion	
Ха	Χh	Χīt	Q ₁	Q ₂	Q_3	95% (JB)	sk	cv	$\hat{y} = DEPV (TEUR)$	\overline{R}^2	sey
1.22	0.60	1.19	0.76	1.03	1.66	[1.11; 1.33] (40.8)	0.45	0.57	ŷ = 0.541 x Sales + 2,288,587	0.60	2,993,990
0.63	0.31	0.59	0.30	0.57	0.90	[0.62;0.64] (392.5)	0.92	0.67	ŷ = 0.336 x Sales + 1,785,555	0.79	9,286,627
1.57	0.82	1.57	0.95	1.60	2.17	[1.48;1.66](110.4)	-0.07	0.50	ŷ = 1.940 x Sales - 1,763,034	0.94	10,706,179
1.14	0.82	1.05	0.66	0.95	1.39	[1.10; 1.17] (292.5)	1.07	0.58	ŷ = 1.328 x Sales - 1,076,804	0.92	3,049,165
0.99	0.78	0.95	0.73	0.92	1.14	[0.97;1.02](82.8)	1.40	0.43	ŷ = 0.906 x Sales + 156,685	0.94	837,225
0.50	0.39	0.44	0.37	0.43	0.52	[0.48;0.52] (1.685.8)	3.81	0.68	ŷ = 0.390 x Sales + 1,505,623	0.91	9,399,264
0.82	0.68	0.76	0.57	0.76	0.94	[0.81;0.83] (685.0)	1.87	0.49	ŷ = 0.417 x Sales + 4,192,313	0.66	9,735,258
1.61	1.09	1.59	0.93	1.46	2.48	[1.50; 1.71] (145.4)	0.16	0.53	ŷ = 1.305 x Sales - 437,565	0.69	16,859,031
0.94	0.26	0.89	0.56	0.84	1.23	[0.93;0.96] (237.6)	1.07	0.53	ŷ = 0.444 x Sales + 1,409,822	0.90	1,718,967
0.75	0.31	0.65	0.22	0.41	1.12	[0.72;0.78] (744.0)	1.04	0.93	ŷ = 0.243 x Sales + 4,087,513	0.11	7,705,202
1.03	0.74	0.96	0.59	0.82	1.39	[1.01;1.06] (558.1)	0.98	0.59	ŷ = 0.936 x Sales - 199,378	0.77	3,612,569
0.97	0.61	0.85	0.42	0.67	1.11	[0.92;1.03](272.9)	1.36	0.78	ŷ = 0.625 x Sales + 314,378	0.75	4,255,102
0.81	0.45	0.69	0.37	0.61	0.97	[0.79; 0.83] (701.2)	1.65	0.81	ŷ = 0.320 x Sales + 3,327,961	0.18	6,850,457
0.64	0.32	0.46	0.26	0.38	0.58	[0.60;0.67] (882.1)	2.32	1.11	ŷ = 0.335 x Sales + 1,422,856	0.69	9,490,305
1.21	0.76	1.13	0.61	1.03	1.57	[1.17; 1.25] (408.7)	0.77	0.61	ŷ = 0.517 x Sales + 1,981,266	0.50	2,349,328
0.70	0.22	0.56	0.30	0.40	0.86	[0.66;0.73] (288.8)	1.86	0.95	ŷ = 0.268 x Sales + 3,631,957	0.59	8,664,653
0.53	0.38	0.44	0.31	0.37	0.56	[0.50;0.56](1.238.7)	3.46	0.85	ŷ = 0.291 x Sales + 3,136,977	0.62	4,329,592
0.66	0.24	0.52	0.24	0.38	0.79	[0.64;0.69] (602.0)	1.81	1.00	ŷ = 0.554 x Sales + 254,562	0.58	5,660,569
0.71	0.28	0.61	0.24	0.54	0.91	[0.69; 0.73] (766.5)	1.44	0.86	ŷ = 0.400 x Sales + 889,398	0.47	8,607,542
0.59	0.23	0.45	0.19	0.30	0.64	[0.56;0.61](619.7)	1.84	1.12	ŷ = 0.165 x Sales + 2,975,341	0.26	4,095,752
0.66	0.31	0.49	0.21	0.30	0.60	[0.61;0.71] (241.4)	1.69	1.14	ŷ = 0.211 x Sales + 1,996,583	0.18	3,123,171
1.29	0.72	1.24	0.61	1.08	1.89	[1.26;1.33] (808.4)	0.50	0.62	ŷ = 0.849 x Sales + 1,131,897	0.69	4,663,604
1.66	1.08	1.68	1.14	1.49	2.56	[1.60; 1.73] (230.5)	0.09	0.48	ŷ = 0.629 x Sales + 5,811,307	0.54	10,271,114
1.29	0.74	1.25	0.64	1.11	1.93	[1.27; 1.32] (1.540.6)	0.36	0.58	ŷ = 0.922 x Sales + 1,129,247	0.51	4,606,606
1.38	0.45	1.35	0.43	1.39	2.23	[1.28 ; 1.47] (255.8)	0.08	0.67	ŷ = 0.243 x Sales + 1,140,076	0.72	3,729,368
1.17	0.79	1.11	0.71	1.01	1.60	[1.09; 1.25] (48.2)	0.87	0.55	ŷ = 0.479 x Sales + 358,630	0.58	458,215
0.84	0.34	0.74	0.29	0.56	1.25	[0.81;0.87] (582.1)	1.08	0.83	ŷ = 0.221 x Sales + 1,969,384	0.38	3,406,536
1.72	1.21	1.72	1.03	1.70	2.53	[1.64; 1.79] (235.3)	0.02	0.48	ŷ = 2.007 x Sales - 1,156,188	0.76	9,655,565
1.13	0.72	1.11	0.52	1.08	1.66	[1.03; 1.24] (45.6)	0.21	0.57	ŷ = 0.706 x Sales + 452,977	0.53	848,300
0.60	0.27	0.46	0.21	0.31	0.61	[0.57; 0.62] (502.2)	1.78	1.06	ŷ = 0.285 x Sales + 1,033,650	0.48	2,877,677
1.34	0.55	1.29	0.54	1.36	1.85	[1.20; 1.48] (62.0)	0.41	0.61	ŷ = 0.445 x Sales + 868,097	0.86	844,662
1.05	0.70	1.06	0.74	0.96	1.44	[1.02; 1.08] (148.7)	-0.23	0.44	ŷ = 0.532 x Sales + 2,507,037	0.77	2,324,246
1.63	0.67	1.67	1.22	1.65	2.01	[1.53; 1.74] (44.0)	-0.35	0.42	ŷ = 1.528 x Sales + 118,332	0.71	614,912
1.11	0.59	1.07	0.61	1.28	1.38	[1.01; 1.21] (20.9)	0.41	0.57	ŷ = 0.169 x Sales + 2,151,532	0.08	1,985,924

Trailing DEPV/EBITDA, 01.07.2019 until 30.06.2022

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	284
В	05 - 09	Mining and quarrying	3,038
CA	10 - 12	Manufacture of food products, beverages, tobacco products	1,009
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	1,465
СС	16 - 18	Manufacture of wood/products, paper/products, printing	639
CD	19	Manufacture of coke and refined petroleum products	258
CE	20	Manufacture of chemicals and chemical products	1,991
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	612
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	1,041
СН	24 - 25	Manufacture of basic metals, fabricated metal products	2,882
CI	26	Manufacture of computer, electronic and optical products	3,054
CJ	27	Manufacture of electrical equipment	1,079
CK	28	Manufacture of machinery and equipment	3,059
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	1,454
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	2,104
D	35	Electricity, gas, steam and air conditioning supply	1,165
E	36 - 39	Water supply, sewerage, waste management, remediation activities	370
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	3,016
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	5,276
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	2,340
I	55 - 56	Accommodation and food/beverage service activities	773
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	3,692
JB	61	Telecommunications	1,728
JC	62 - 63	Computer programming/consultancy, information service activities	4,428
К	64 - 66	Financial and insurance activities	1,621
L	68	Real estate activities	918
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	3,365
MB	72	Scientific research and development	875
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	290
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	2,034
P	85	Education	204
Q	86 - 88	Human health and social work activities	623
R	90 - 93	Arts, entertainment and recreation	478
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	177

	xh x̄t Q1 Q2 Q3 95% (J 1.33 7.91 3.87 5.92 10.84 [-1.85;18.34] 1.67 5.27 0.88 4.02 10.62 [3.67;7.91] (3 3.35 8.17 5.07 8.03 10.80 [5.34;11.57] (1 6.95 9.11 6.77 8.55 11.65 [7.23;11.31] (1 3.04 7.65 3.54 5.65 14.26 [1.69;14.44] (1 4.62 7.99 5.02 8.63 11.15 [2.90;13.36] (1 1.34 5.18 0.78 4.09 10.28 [2.88;8.70] (2 6.16 10.72 6.47 10.98 14.42 [6.18;15.19] (1 3.88 6.95 3.65 6.00 10.56 [4.28;10.49] (2 1.179 7.52 5.77 6.98 9.85 [6.50;9.20] (2 6.01 9.09 4.91 8.80 12.63 [7.50;11.05] (2 3.55 6.14 4.55 4.91 7								Trailing EBITDA Re	gression	
Ха	Хh	Χ̄t	Q1	Q2	Q ₃	95% (JB)	sk	cv	ŷ = DEPV (TEUR)	\overline{R}^2	sey
8.25	1.33	7.91	3.87	5.92	10.84	[-1.85; 18.34] (37.7)	0.60	0.74	ŷ = 18.229 x EBITDA - 277,919	0.96	674,114
5.79	1.67	5.27	0.88	4.02	10.62	[3.67; 7.91] (364.9)	0.71	0.88	ŷ = 3.344 x EBITDA + 1,009,759	0.39	14,222,949
8.46	3.35	8.17	5.07	8.03	10.80	[5.34;11.57] (99.4)	0.48	0.55	ŷ = 12.489 x EBITDA - 901,365	0.93	8,347,015
9.27	6.95	9.11	6.77	8.55	11.65	[7.23;11.31](143.3)	0.30	0.45	ŷ = 6.860 x EBITDA + 816,509	0.82	1,195,048
8.06	3.04	7.65	3.54	5.65	14.26	[1.69; 14.44] (89.0)	0.68	0.74	ŷ = 7.064 x EBITDA + 494,439	0.66	2,092,107
8.13	4.62	7.99	5.02	8.63	11.15	[2.90;13.36](22.6)	0.16	0.53	ŷ = 5.381 x EBITDA + 2,673,382	0.91	9,549,750
5.79	1.34	5.18	0.78	4.09	10.28	[2.88;8.70] (242.5)	0.62	0.92	ŷ = 0.171 x EBITDA + 4,662,743	0.00	5,698,524
10.69	6.16	10.72	6.47	10.98	14.42	[6.18;15.19] (79.3)	-0.11	0.46	ŷ = 10.052 x EBITDA + 365,296	0.84	2,396,434
7.39	3.88	6.95	3.65	6.00	10.56	[4.28; 10.49] (113.1)	0.76	0.64	ŷ = 6.712 x EBITDA + 58,919	0.79	2,346,144
7.85	1.79	7.52	5.77	6.98	9.85	[6.50;9.20] (212.3)	0.79	0.51	ŷ = 4.220 x EBITDA + 1,403,024	0.74	2,325,123
9.27	6.01	9.09	4.91	8.80	12.63	[7.50;11.05] (364.9)	0.26	0.50	ŷ = 7.391 x EBITDA + 212,562	0.85	3,121,169
6.85	3.55	6.14	4.55	4.91	7.84	[4.45;9.24] (89.2)	1.50	0.61	ŷ = 6.935 x EBITDA - 519,827	0.95	2,492,671
8.01	4.72	7.64	5.68	7.08	9.97	[6.65;9.36] (217.7)	0.83	0.51	ŷ = 8.105 x EBITDA + 21,694	0.71	2,994,467
8.71	1.41	8.43	6.38	7.15	11.15	[6.50; 10.92] (132.0)	0.61	0.49	ŷ = 1.718 x EBITDA + 4,648,874	0.45	3,967,727
9.54	3.29	9.62	7.52	8.72	12.82	[7.86; 11.22] (174.4)	-0.04	0.43	ŷ = 6.446 x EBITDA + 1,278,639	0.77	1,482,565
9.04	2.48	8.84	4.57	8.42	13.46	[5.13; 12.95] (154.6)	0.25	0.60	ŷ = 10.304 x EBITDA + 1,017,533	0.87	5,563,857
9.61	5.49	9.55	4.85	9.07	14.55	[2.76; 16.46] (52.7)	0.14	0.56	ŷ = 6.629 × EBITDA + 688,111	0.82	1,359,412
6.81	1.41	6.27	2.52	5.54	9.32	[4.53;9.08] (323.5)	0.75	0.77	ŷ = 9.006 x EBITDA - 168,705	0.65	1,691,420
8.02	2.98	7.66	3.71	7.55	11.57	[6.57;9.47](575.3)	0.54	0.60	ŷ = 4.716 x EBITDA + 985,558	0.88	4,166,336
7.90	3.16	7.68	3.82	7.53	12.24	[5.80;10.00](286.6)	0.38	0.60	ŷ = 4.237 x EBITDA + 1,512,944	0.32	3,465,764
7.41	5.27	6.75	4.20	6.67	8.42	[4.26; 10.55] (68.1)	1.22	0.59	ŷ = 3.995 x EBITDA + 537,027	0.77	1,087,630
7.57	3.54	7.12	4.12	6.04	10.22	[5.99;9.14] (365.0)	0.79	0.61	ŷ = 5.061 x EBITDA + 420,648	0.86	4,185,843
6.84	4.50	6.20	3.71	5.63	8.75	[4.92;8.76](145.9)	1.26	0.61	ŷ = 3.992 x EBITDA + 2,353,224	0.76	7,360,065
7.64	3.16	7.20	4.05	6.08	10.70	[6.03;9.25](451.1)	0.71	0.64	ŷ = 5.440 x EBITDA + 256,910	0.93	1,358,521
8.11	3.53	7.66	3.23	7.20	11.83	[4.78;11.44](195.1)	0.55	0.67	ŷ = 5.796 x EBITDA + 145,859	0.91	856,012
10.41	5.90	10.34	6.43	9.56	14.67	[6.62;14.20](116.9)	0.10	0.48	ŷ = 10.130 x EBITDA + 84,390	0.76	934,705
7.92	4.16	7.65	4.75	6.85	11.21	[6.29; 9.55] (347.4)	0.52	0.58	ŷ = 6.741 x EBITDA + 472,944	0.80	1,565,769
11.21	4.69	11.44	7.41	13.15	14.93	[7.06 ; 15.35] (109.0)	-0.44	0.46	ŷ = 8.073 x EBITDA + 962,554	0.74	1,816,518
5.70	1.00	5.06	1.82	4.65	7.79	[-0.63;12.03] (23.7)	1.09	0.86	ŷ = 12.622 × EBITDA - 37,139	0.94	121,605
6.35	2.56	5.89	3.49	5.47	8.39	[4.61;8.10] (149.5)	1.06	0.66	ŷ = 5.106 × EBITDA + 112,282	0.88	897,123
6.94	5.02	6.35	4.02	6.19	8.36	[1.23; 12.65] (14.3)	1.33	0.61	ŷ = 6.492 x EBITDA + 20,493	0.97	141,154
8.05	6.34	7.77	6.54	7.39	8.79	[5.94; 10.16] (31.4)	0.92	0.42	ŷ = 7.350 x EBITDA - 9,188	0.99	347,378
10.02	3.96	10.12	5.39	9.83	14.69	[4.05 ; 15.99] (65.0)	-0.08	0.54	ŷ = 6.069 x EBITDA + 182,223	0.69	449,424
5.41	3.02	4.53	2.38	3.38	6.34	[-2.77; 13.58] (16.0)	1.58	0.91	ŷ = 3.223 x EBITDA + 86,449	0.91	312,421

Forward DEPV/EBITDA, 01.07.2019 until 30.06.2022

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	413
В	05 - 09	Mining and quarrying	6,360
CA	10 - 12	Manufacture of food products, beverages, tobacco products	966
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	3,113
СС	16 - 18	Manufacture of wood/products, paper/products, printing	1,326
CD	19	Manufacture of coke and refined petroleum products	762
CE	20	Manufacture of chemicals and chemical products	5,185
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1,530
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	4,154
СН	24 - 25	Manufacture of basic metals, fabricated metal products	6,236
CI	26	Manufacture of computer, electronic and optical products	6,521
CJ	27	Manufacture of electrical equipment	3,247
СК	28	Manufacture of machinery and equipment	7,584
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	4,986
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	4,025
D	35	Electricity, gas, steam and air conditioning supply	3,317
E	36 - 39	Water supply, sewerage, waste management, remediation activities	1,068
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	7,573
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	9,365
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	6,086
Ι	55 - 56	Accommodation and food/beverage service activities	2,238
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	6,585
JB	61	Telecommunications	2,066
JC	62 - 63	Computer programming/consultancy, information service activities	8,534
K	64 - 66	Financial and insurance activities	2,812
L	68	Real estate activities	2,979
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	6,671
MB	72	Scientific research and development	2,190
МС	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	322
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	5,007
Ρ	85	Education	542
Q	86 - 88	Human health and social work activities	1,100
R	90 - 93	Arts, entertainment and recreation	467
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	386

			Forv	ward DEF	PV/EBITI	DA Multiples			Forward EBITDA Regression			
Хa	Хh	Χt	Q ₁	Q2	Q ₃	95% (JB)	sk	cv	$\hat{y} = DEPV (TEUR)$	\overline{R}^2	sey	
6.25	4.94	5.80	4.54	5.61	6.66	[3.98; 8.53] (92.2)	2.13	0.51	ŷ = 4.881 x EBITDA + 570,005	0.92	1,267,546	
2.60	1.48	2.37	1.31	2.24	3.37	[2.41;2.79] (6.124.9)	2.56	0.71	ŷ = 1.108 x EBITDA + 3,517,791	0.73	10,424,913	
7.56	6.03	7.32	5.00	7.29	9.70	[6.00;9.12](69.2)	0.69	0.43	ŷ = 5.920 x EBITDA + 1,590,157	0.86	16,107,911	
5.26	4.25	5.08	3.76	5.02	6.19	[4.83;5.69] (137.0)	0.98	0.44	ŷ = 8.814 x EBITDA - 3,291,307	0.93	2,684,782	
5.59	5.01	5.35	4.31	5.27	6.34	[5.09;6.08](142.3)	1.69	0.36	ŷ = 4.570 x EBITDA + 352,100	0.96	698,128	
2.68	2.05	2.50	1.97	2.40	3.06	[2.29;3.08] (901.4)	3.13	0.58	ŷ = 1.802 x EBITDA + 3,575,776	0.89	10,661,947	
4.29	3.18	3.68	2.36	3.41	4.83	[3.71;4.86] (1.923.1)	2.51	0.71	ŷ = 2.017 x EBITDA + 4,088,752	0.70	9,097,327	
10.02	5.71	10.03	5.43	10.20	14.74	[6.78;13.27] (204.7)	-0.06	0.53	ŷ = 5.043 x EBITDA + 807,712	0.78	12,148,750	
5.14	1.30	4.82	3.69	4.78	5.75	[4.77;5.50] (477.6)	1.75	0.44	ŷ = 3.223 x EBITDA + 903,401	0.85	2,232,336	
4.17	2.47	3.91	2.18	3.24	6.27	[3.76;4.58] (502.7)	0.97	0.64	ŷ = 5.177 x EBITDA - 286,213	0.61	5,142,092	
5.98	4.04	5.61	3.29	5.48	7.48	[5.32;6.64](351.8)	1.29	0.57	ŷ = 5.406 x EBITDA - 38,648	0.85	2,903,601	
7.30	5.29	6.93	3.81	5.98	10.24	[6.05; 8.54] (369.7)	0.66	0.54	ŷ = 4.923 x EBITDA + 1,050,218	0.70	5,302,835	
6.15	4.43	5.68	3.67	5.32	7.46	[5.52;6.78] (521.5)	1.29	0.56	ŷ = 6.348 x EBITDA - 438,044	0.70	4,691,121	
4.54	3.00	3.94	2.56	3.50	5.32	[3.89; 5.20] (456.5)	1.62	0.70	ŷ = 2.250 x EBITDA + 2,970,730	0.74	8,682,153	
5.87	4.30	5.08	3.60	4.91	6.16	[4.78;6.97] (525.6)	2.01	0.67	ŷ = 3.014 x EBITDA + 1,442,482	0.66	1,995,351	
5.94	3.07	5.45	3.53	5.29	7.57	[4.77; 7.12] (207.1)	1.31	0.65	ŷ = 0.799 x EBITDA + 5,777,654	0.70	6,897,279	
3.24	2.57	3.03	1.94	3.06	4.19	[2.86; 3.62] (69.8)	1.45	0.51	ŷ = 1.926 x EBITDA + 2,970,703	0.57	4,587,794	
6.02	3.54	5.40	3.26	4.61	7.90	[5.14;6.90] (585.4)	1.29	0.68	ŷ = 3.416 x EBITDA + 1,508,590	0.70	4,365,488	
5.07	3.27	4.67	2.57	4.57	6.48	[4.59;5.55] (591.5)	1.42	0.63	ŷ = 3.158 x EBITDA + 1,352,098	0.78	5,646,418	
3.72	1.85	3.29	1.75	2.50	5.12	[3.21; 4.24] (495.6)	1.62	0.80	ŷ = 1.511 x EBITDA + 2,725,537	0.30	4,194,894	
5.16	3.59	4.67	2.59	3.60	6.82	[4.05;6.28] (201.0)	1.16	0.66	ŷ = 2.666 x EBITDA + 1,641,802	0.27	2,934,787	
6.98	4.98	6.55	4.51	6.51	8.65	[6.26; 7.70] (397.9)	1.11	0.52	ŷ = 4.967 x EBITDA + 778,458	0.76	5,488,475	
5.52	4.60	5.38	3.81	5.27	7.14	[5.02;6.02](79.0)	0.95	0.41	ŷ = 3.085 x EBITDA + 3,346,705	0.82	6,100,597	
7.15	4.37	6.68	4.33	6.06	8.92	[6.25;8.06](690.1)	1.01	0.60	ŷ = 6.758 x EBITDA - 389,051	0.81	4,006,507	
7.29	2.40	6.88	4.27	5.97	10.01	[5.76; 8.81] (266.1)	0.80	0.58	ŷ = 1.601 x EBITDA + 1,392,772	0.71	2,939,883	
10.46	7.58	10.36	7.29	9.72	13.82	[8.83; 12.09] (344.5)	0.23	0.42	ŷ = 11.035 x EBITDA - 119,450	0.81	2,718,927	
4.92	3.10	4.41	2.97	4.30	5.45	[4.34;5.51] (519.8)	1.54	0.66	ŷ = 3.141 x EBITDA + 835,786	0.65	2,611,124	
10.28	6.38	10.25	6.82	9.24	14.75	[7.69; 12.86] (269.6)	0.13	0.50	ŷ = 6.399 x EBITDA + 302,465	0.78	8,616,754	
5.42	3.71	5.20	2.98	5.16	7.20	[3.13; 7.70] (35.6)	0.57	0.55	ŷ = 3.880 x EBITDA + 245,095	0.75	617,425	
4.56	3.41	4.16	2.75	3.72	5.46	[4.11;5.00] (366.7)	1.53	0.58	ŷ = 2.104 × EBITDA + 1,881,890	0.53	2,767,665	
7.22	4.74	6.85	3.46	6.29	10.80	[3.69; 10.75] (60.3)	0.69	0.59	ŷ = 2.830 x EBITDA + 984,371	0.84	866,752	
5.05	4.04	4.97	3.74	5.38	6.25	[4.63 ; 5.47] (56.9)	0.44	0.35	ŷ = 2.927 x EBITDA + 1,950,818	0.83	2,008,811	
6.88	4.36	6.91	5.43	6.92	8.74	[5.47;8.28] (29.6)	-0.09	0.38	ŷ = 6.477 x EBITDA + 166,429	0.69	648,285	
5.68	3.62	4.84	3.32	3.83	5.56	[0.97;10.39] (37.6)	1.56	0.80	ŷ = 3.557 x EBITDA + 207,848	0.95	449,672	

Trailing DEPV/EBIT, 01.07.2019 until 30.06.2022

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	360
В	05 - 09	Mining and quarrying	1,717
CA	10 - 12	Manufacture of food products, beverages, tobacco products	955
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	934
СС	16 - 18	Manufacture of wood/products, paper/products, printing	843
CD	19	Manufacture of coke and refined petroleum products	231
CE	20	Manufacture of chemicals and chemical products	1,095
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	649
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	982
СН	24 - 25	Manufacture of basic metals, fabricated metal products	2,904
CI	26	Manufacture of computer, electronic and optical products	2,925
CJ	27	Manufacture of electrical equipment	1,004
СК	28	Manufacture of machinery and equipment	2,995
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	1,465
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	1,621
D	35	Electricity, gas, steam and air conditioning supply	1,138
E	36 - 39	Water supply, sewerage, waste management, remediation activities	360
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	3,086
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	4,680
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	1,959
	55 - 56	Accommodation and food/beverage service activities	687
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	3,188
JB	61	Telecommunications	1,787
JC	62 - 63	Computer programming/consultancy, information service activities	4,063
К	64 - 66	Financial and insurance activities	2,587
L	68	Real estate activities	1,433
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	2,823
MB	72	Scientific research and development	703
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	306
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	1,846
Ρ	85	Education	161
Q	86 - 88	Human health and social work activities	623
R	90 - 93	Arts, entertainment and recreation	274
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	145

			Tra	ailing DE	PV/EBIT	Multiples			Trailing EBIT Reg	ression	
Ха	Хh	Χīt	Q1	Q2	Q_3	95% (JB)	sk	cv	ŷ = DEPV (TEUR)	\overline{R}^2	sey
13.81	2.31	13.61	5.10	9.53	23.39	[-10.19 ; 37.80] (58.7)	0.23	0.73	ŷ = 24.947 x EBIT - 296,955	0.96	955,230
10.58	3.62	9.64	4.26	8.52	13.34	[4.00;17.17](177.1)	0.96	0.73	ŷ = 5.301 x EBIT + 7,124,247	0.52	14,001,150
11.83	4.98	11.41	5.80	10.94	15.71	[4.94;18.72] (93.7)	0.44	0.58	ŷ = 15.012 x EBIT - 511,424	0.94	7,984,518
14.21	9.30	14.23	7.48	14.87	19.13	[7.59;20.82] (100.2)	-0.10	0.47	ŷ = 9.939 x EBIT + 877,369	0.63	1,310,587
15.66	5.45	15.77	6.89	12.94	26.78	[0.14;31.17] (138.7)	0.04	0.64	ŷ = 11.824 x EBIT + 921,067	0.63	2,384,385
11.84	5.84	11.03	5.26	11.49	15.73	[-6.73; 30.41] (20.3)	0.76	0.67	ŷ = 6.735 x EBIT + 2,371,642	0.57	8,071,959
12.28	3.16	11.89	7.72	12.63	15.43	[6.47; 18.08] (73.9)	0.47	0.53	ŷ = 11.685 x EBIT + 547,276	0.83	2,818,027
14.53	7.11	14.27	7.65	14.03	19.38	[2.91 ; 26.15] (78.5)	0.29	0.56	ŷ = 12.740 x EBIT + 422,263	0.85	1,326,498
10.55	3.54	10.04	4.90	9.28	15.16	[3.92;17.18] (95.4)	0.62	0.64	ŷ = 8.564 x EBIT + 54,804	0.98	481,421
10.66	4.08	10.26	7.04	10.35	13.13	[8.33;13.00] (157.0)	0.83	0.49	ŷ = 5.778 x EBIT + 1,131,473	0.81	2,005,266
13.23	8.68	13.04	7.93	13.24	17.67	[10.05;16.41] (269.3)	0.27	0.47	ŷ = 7.818 x EBIT + 855,338	0.84	3,274,729
10.61	5.57	9.63	7.30	7.95	12.30	[4.81;16.40] (80.5)	1.44	0.60	ŷ = 7.224 x EBIT + 541,417	0.94	2,883,941
11.18	5.98	10.69	7.11	10.42	14.42	[8.31;14.05] (185.2)	0.87	0.53	ŷ = 9.618 x EBIT + 439,060	0.66	3,328,145
12.41	8.98	11.95	6.94	11.38	16.91	[7.68;17.14] (145.3)	0.62	0.51	ŷ = 6.051 x EBIT + 3,676,598	0.39	7,968,621
14.31	3.55	14.08	9.31	12.82	19.75	[6.72;21.89] (190.5)	0.37	0.57	ŷ = 7.551 x EBIT + 1,246,728	0.75	1,444,967
12.16	4.09	11.91	5.16	11.29	18.74	[4.40;19.91] (145.8)	0.25	0.62	ŷ = 9.588 x EBIT + 3,089,959	0.75	9,450,023
13.37	7.94	12.99	7.28	11.18	17.47	[-0.61;27.35] (41.3)	0.46	0.57	ŷ = 9.860 x EBIT + 451,832	0.86	1,218,411
9.00	2.00	8.37	3.88	7.67	13.88	[5.43; 12.57] (279.5)	0.79	0.73	ŷ = 13.883 × EBIT - 301,656	0.72	2,572,520
11.11	0.85	10.39	5.29	9.25	15.90	[7.25 ; 14.98] (511.9)	0.76	0.69	ŷ = 11.518 x EBIT + 23,397	0.84	3,513,881
14.35	4.21	14.24	8.02	14.04	21.09	[8.19;20.51] (239.2)	0.11	0.54	ŷ = 3.092 x EBIT + 2,743,597	0.12	4,089,590
9.71	4.98	8.61	4.24	6.80	12.74	[0.03 ; 19.38] (69.2)	1.21	0.77	ŷ = 3.838 x EBIT + 708,129	0.71	1,265,573
12.80	4.57	12.49	6.96	12.52	17.62	[8.57;17.03] (348.3)	0.33	0.57	ŷ = 9.356 x EBIT + 1,257,293	0.85	4,633,596
13.51	8.45	13.15	8.33	13.44	16.76	[9.21; 17.82] (174.5)	0.41	0.47	ŷ = 11.620 x EBIT + 275,014	0.87	5,380,351
12.65	3.79	12.24	5.15	12.42	19.07	[7.81; 17.49] (523.6)	0.33	0.65	ŷ = 15.097 x EBIT + 82,486	0.97	822,670
11.42	2.51	10.74	5.43	9.02	18.11	[5.47;17.37] (310.0)	0.66	0.71	ŷ = 6.540 x EBIT + 256,872	0.60	1,452,250
13.82	6.77	13.63	8.31	13.81	19.24	[7.16;20.49] (165.6)	0.17	0.54	ŷ = 15.363 x EBIT - 13,585	0.77	1,461,796
10.56	4.15	9.76	5.80	8.91	13.97	[6.31;14.80] (234.2)	0.95	0.67	ŷ = 7.332 x EBIT + 577,233	0.79	1,729,347
14.58	4.62	14.53	8.02	15.39	21.00	[3.49;25.66] (86.0)	0.03	0.55	ŷ = 12.780 x EBIT + 356,553	0.87	1,147,603
7.49	1.02	6.17	1.83	5.14	8.04	[-9.24;24.22] (28.3)	1.45	1.07	ŷ = 21.634 x EBIT - 37,884	0.88	143,982
9.71	2.99	8.81	4.51	7.91	13.05	[4.42;15.01](155.9)	1.09	0.73	ŷ = 5.485 x EBIT + 345,669	0.75	1,351,905
10.34	5.31	9.15	4.86	7.69	13.48	[-13.15; 33.83] (15.1)	1.12	0.78	ŷ = 14.466 x EBIT - 8,472	0.99	73,196
15.93	10.07	16.34	12.95	18.25	19.35	[9.00;22.85] (54.1)	-0.63	0.39	ŷ = 18.236 × EBIT - 126,680	0.95	731,030
11.48	3.41	10.74	4.61	8.07	16.44	[-7.85; 30.80] (30.9)	0.66	0.73	ŷ = 6.040 x EBIT + 238,245	0.66	484,484
7.54	4.70	7.09	3.49	8.10	9.92	[-1.04;16.11](13.2)	0.67	0.63	ŷ = 9.652 x EBIT - 117,191	0.94	282,023

Forward DEPV/EBIT, 01.07.2019 until 30.06.2022

		NACE Rev. 2 Sector	n
А	01-03	Agriculture, forestry and fishing	381
В	05 - 09	Mining and quarrying	6,279
CA	10 - 12	Manufacture of food products, beverages, tobacco products	966
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	3,097
СС	16 - 18	Manufacture of wood/products, paper/products, printing	1,288
CD	19	Manufacture of coke and refined petroleum products	762
CE	20	Manufacture of chemicals and chemical products	5,190
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1,320
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	4,133
СН	24 - 25	Manufacture of basic metals, fabricated metal products	6,156
CI	26	Manufacture of computer, electronic and optical products	6,210
CJ	27	Manufacture of electrical equipment	3,231
СК	28	Manufacture of machinery and equipment	7,122
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	4,836
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	4,100
D	35	Electricity, gas, steam and air conditioning supply	2,946
E	36 - 39	Water supply, sewerage, waste management, remediation activities	1,068
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	7,578
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	9,092
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	5,952
I	55 - 56	Accommodation and food/beverage service activities	2,238
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	6,322
JB	61	Telecommunications	2,029
JC	62 - 63	Computer programming/consultancy, information service activities	8,174
К	64 - 66	Financial and insurance activities	2,850
L	68	Real estate activities	3,156
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	6,499
MB	72	Scientific research and development	2,104
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	317
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	4,991
Р	85	Education	542
Q	86 - 88	Human health and social work activities	1,090
R	90 - 93	Arts, entertainment and recreation	462
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	327

			Foi	rward DI	EPV/EBI	Г Multiples			Forward EBIT Reg	ression	
Ха	Хh	Χ̈́t	Q ₁	Q ₂	Q ₃	95% (JB)	sk	cv	$\hat{y} = DEPV (TEUR)$	\overline{R}^2	sey
8.41	6.67	7.94	6.45	8.05	9.50	[4.81;12.01] (90.2)	2.07	0.47	ŷ = 6.471 x EBIT + 784,033	0.90	1,466,674
4.30	2.28	3.66	2.14	3.09	5.56	[3.52; 5.07] (1.533.7)	2.19	0.86	ŷ = 1.339 x EBIT + 4,210,993	0.68	11,535,854
10.12	8.17	9.73	7.02	9.31	12.66	[7.34;12.91] (69.6)	0.81	0.43	ŷ = 7.442 x EBIT + 1,710,271	0.86	16,463,179
8.93	7.46	8.71	6.23	8.03	11.81	[7.83;10.04] (220.6)	0.72	0.41	ŷ = 12.453 x EBIT - 1,994,805	0.94	2,633,835
8.51	7.59	7.98	6.79	7.69	9.37	[6.88;10.14] (1.072.9)	2.96	0.42	ŷ = 5.962 x EBIT + 605,400	0.96	710,196
4.15	2.95	3.70	2.88	3.58	4.56	[2.81;5.48](1.020.4)	3.33	0.69	ŷ = 2.496 x EBIT + 3,941,999	0.87	11,259,671
6.94	4.83	6.24	3.25	5.73	9.43	[5.61;8.28](466.0)	1.67	0.66	ŷ = 2.780 x EBIT + 4,412,442	0.70	9,173,590
13.22	6.99	12.79	6.18	11.98	18.57	[4.95;21.48] (163.4)	0.41	0.62	ŷ = 6.822 x EBIT + 446,245	0.85	10,600,068
8.87	2.10	8.25	5.82	8.62	10.27	[7.48;10.27] (485.0)	1.79	0.50	ŷ = 4.842 x EBIT + 1,208,846	0.84	2,316,937
5.73	3.72	5.52	2.86	5.28	8.59	[5.09;6.38] (429.8)	0.72	0.58	ŷ = 7.079 x EBIT - 302,629	0.66	4,849,479
8.34	6.21	7.82	4.81	7.55	11.00	[7.13;9.55] (409.8)	1.45	0.55	ŷ = 6.783 x EBIT + 296,374	0.85	2,930,079
11.07	7.39	10.26	5.92	8.15	16.17	[7.20;14.94] (368.4)	0.85	0.63	ŷ = 7.362 x EBIT + 799,741	0.78	4,539,602
7.91	6.03	7.25	5.54	7.08	9.13	[6.91;8.91](1.176.6)	1.98	0.54	ŷ = 8.579 x EBIT - 334,294	0.75	4,283,081
6.87	5.02	6.27	4.50	5.83	7.81	[5.93; 7.81] (382.9)	1.37	0.55	ŷ = 3.228 x EBIT + 3,792,583	0.78	8,049,843
9.65	6.56	8.55	5.40	7.58	11.85	[6.69 ; 12.62] (335.8)	1.42	0.67	ŷ = 4.085 x EBIT + 1,770,855	0.58	2,127,075
8.57	4.24	8.52	6.08	8.15	11.40	[7.09;10.05] (207.1)	0.24	0.49	ŷ = 0.926 x EBIT + 7,038,186	0.67	7,510,551
5.87	4.86	5.65	3.92	5.32	7.13	[5.00;6.75](64.3)	0.89	0.43	ŷ = 4.279 x EBIT + 1,932,307	0.65	4,151,134
7.73	5.45	7.17	4.92	6.71	9.37	[6.74;8.72](479.0)	1.40	0.56	ŷ = 5.720 x EBIT + 1,050,501	0.77	3,775,167
8.34	5.63	7.83	4.37	7.51	11.20	[7.19;9.49] (554.9)	0.96	0.59	ŷ = 4.788 x EBIT + 2,057,703	0.78	5,713,783
7.36	4.89	7.01	4.68	6.60	9.29	[6.41;8.32](275.8)	1.06	0.55	ŷ = 4.479 x EBIT + 2,067,615	0.56	3,286,530
8.72	6.00	7.61	4.19	5.72	11.22	[4.97 ; 12.46] (187.0)	1.55	0.72	ŷ = 5.604 x EBIT + 972,831	0.40	2,668,565
10.51	7.53	9.93	6.83	9.91	12.62	[9.00;12.02] (329.0)	1.24	0.49	ŷ = 8.658 x EBIT + 589,774	0.90	3,615,136
11.13	9.50	11.12	8.41	11.39	13.56	[9.69; 12.57] (41.9)	0.38	0.34	ŷ = 6.630 x EBIT + 3,565,405	0.76	7,100,221
11.02	7.51	10.41	6.97	10.35	13.32	[9.27 ; 12.77] (508.5)	0.97	0.54	ŷ = 9.844 x EBIT + 190,810	0.90	2,915,278
8.70	3.31	8.53	5.55	8.74	11.37	[7.12;10.28] (119.2)	0.58	0.50	ŷ = 3.327 x EBIT + 1,133,559	0.81	2,352,151
10.77	7.77	10.36	7.19	9.83	13.80	[8.76; 12.78] (225.3)	0.79	0.46	ŷ = 8.560 x EBIT + 842,058	0.72	3,258,365
7.54	5.23	6.99	4.71	6.26	9.96	[6.47;8.62](410.0)	1.42	0.58	ŷ = 4.711 x EBIT + 987,135	0.70	2,429,209
14.74	8.41	14.57	8.31	12.54	23.29	[7.92;21.56] (279.5)	0.32	0.56	ŷ = 7.821 x EBIT + 534,646	0.85	7,367,775
9.77	6.24	9.39	4.99	9.29	13.27	[1.63;17.90](19.1)	0.70	0.58	ŷ = 8.090 x EBIT + 202,034	0.47	1,150,451
7.22	5.63	6.41	4.35	5.79	8.55	[5.94; 8.50] (2.254.6)	2.60	0.62	ŷ = 4.783 x EBIT + 1,066,056	0.65	2,388,618
9.66	7.35	9.19	6.81	7.87	13.39	[5.47;13.85] (39.2)	1.04	0.48	ŷ = 6.217 x EBIT + 676,055	0.86	809,475
10.50	7.52	10.69	7.96	9.45	14.45	[8.42;12.59] (143.7)	-0.23	0.37	ŷ = 4.331 x EBIT + 2,839,478	0.75	2,423,798
11.14	6.49	11.19	8.75	11.02	14.14	[7.11;15.17] (18.6)	0.03	0.39	ŷ = 7.712 x EBIT + 397,300	0.65	681,487
8.61	6.51	8.46	7.19	9.58	9.90	[5.40;11.82](16.4)	0.20	0.42	ŷ = 9.963 x EBIT - 330,598	0.93	562,330

		NACE Rev. 2 Sector	n					
А	01-03	Agriculture, forestry and fishing	585					
В	05 - 09	Mining and quarrying						
CA	10 - 12	Manufacture of food products, beverages, tobacco products	1,369					
СВ	13 - 15	Manufacture of textiles, wearing apparel, teather and related products	1,696					
СС	16 - 18	Manufacture of wood/products, paper/products, printing	950					
CD	19	Manufacture of coke and refined petroleum products	923					
CE	20	Manufacture of chemicals and chemical products	4,181					
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations						
CG	22 - 23	Manufacture of rubber, plastic products, other non-metallic mineral products	3,344					
СН	24 - 25	Manufacture of basic metals, fabricated metal products	5,898					
CI	26	Manufacture of computer, electronic and optical products	3,977					
CJ	27	Manufacture of electrical equipment	3,161					
СК	28	Manufacture of machinery and equipment	5,233					
CL	29 - 30	Manufacture of motor vehicles, trailers, other transport equipment	4,025					
СМ	31 - 33	Manufacture of furniture, other manufacturing, repair/installation of machinery and equipment	1,594					
D	35	Electricity, gas, steam and air conditioning supply	3,553					
E	36 - 39	Water supply, sewerage, waste management, remediation activities	1,395					
F	41 - 43	Construction - Buildings, civil engineering, specialized construction activities	7,739					
G	45 - 47	Wholesale/Retail trade, repair of motor vehicles and motorcycles	7,734					
Н	49 - 53	Transportation and storage - Land/pipelines, water, air; warehousing, postal/courier activities	5,528					
	55 - 56	Accommodation and food/beverage service activities	2,587					
JA	58 - 60	Publishing, motion picture/video/television programme production, music publishing, broadcasting	5,909					
JB	61	Telecommunications	2,082					
JC	62 - 63	Computer programming/consultancy, information service activities	7,959					
К	64 - 66	Financial and insurance activities	5,576					
L	68	Real estate activities	4,074					
MA	69 - 71	Legal/accounting activities, management consultancy, architectural/engineering activities, technical testing	6,526					
MB	72	Scientific research and development	1,471					
MC	73 - 75	Advertising/market research, other professional/scientific/technical activities, veterinary activities	569					
Ν	77 - 82	Rental/employment/security activities, travel agency, facility management, office/business support activities	5,378					
Ρ	85	Education	403					
Q	86 - 88	Human health and social work activities	1,063					
R	90 - 93	Arts, entertainment and recreation	666					
S	94 - 96	Other service activities - repair of computers/personal/household goods, other personal service activities	376					

	Trailing DEPV/Invested Capital Multiples							Trailing Invested Capital Regression			
Ха	Χh	Χt	Q ₁	Q ₂	Q ₃	95% (JB)	sk	cv	ŷ = DEPV (TEUR)	\overline{R}^2	sey
0.55	0.14	0.54	0.20	0.52	0.84	[0.52;0.58] (84.4)	0.21	0.68	ŷ = 1.081 × IC - 48,805	0.95	178,222
0.56	0.39	0.56	0.40	0.57	0.70	[0.56;0.57] (555.8)	0.16	0.41	ŷ = 0.593 x IC + 15,522	0.85	7,273,172
0.65	0.36	0.65	0.39	0.64	0.89	[0.64;0.66](166.2)	0.15	0.48	ŷ = 0.920 x IC - 35,368	0.98	4,155,923
0.77	0.59	0.78	0.60	0.79	0.96	[0.76;0.78](150.7)	-0.50	0.34	ŷ = 0.884 x IC - 52,867	0.95	651,888
0.75	0.43	0.76	0.44	0.79	1.08	[0.73;0.77](135.4)	-0.27	0.48	ŷ = 1.003 × IC - 9,347	0.97	368,727
0.64	0.38	0.63	0.42	0.65	0.81	[0.63;0.65] (99.5)	0.11	0.38	ŷ = 0.644 x IC + 1,324,484	0.81	12,068,751
0.74	0.37	0.75	0.57	0.72	0.94	[0.74;0.75] (351.3)	-0.16	0.33	ŷ = 0.845 x IC - 539,903	0.94	3,683,773
0.77	0.22	0.78	0.60	0.77	0.98	[0.76;0.78](125.7)	-0.32	0.34	ŷ = 0.861 x IC - 835,352	0.94	6,450,221
0.73	0.23	0.75	0.49	0.81	0.95	[0.72;0.73] (386.9)	-0.54	0.40	ŷ = 0.633 x IC + 602,006	0.81	2,762,348
0.55	0.17	0.53	0.34	0.51	0.74	[0.54;0.55](621.1)	0.52	0.49	ŷ = 0.320 × IC + 621,266	0.76	1,589,110
0.75	0.50	0.76	0.52	0.74	1.04	[0.74;0.76] (515.6)	-0.17	0.42	ŷ = 0.765 x IC + 35,402	0.95	1,615,942
0.76	0.52	0.77	0.56	0.77	0.97	[0.76;0.77] (318.3)	-0.11	0.36	ŷ = 0.766 x IC + 34,591	0.96	1,390,335
0.70	0.46	0.70	0.37	0.69	0.99	[0.69;0.71](725.0)	-0.02	0.47	ŷ = 0.323 x IC + 1,308,477	0.62	2,251,326
0.63	0.15	0.61	0.35	0.61	0.89	[0.62;0.63](536.9)	0.26	0.49	ŷ = 0.729 x IC - 2,243,933	0.77	8,843,997
0.65	0.25	0.65	0.43	0.62	0.88	[0.64;0.66](174.2)	0.07	0.50	ŷ = 0.629 x IC + 82,990	0.96	561,098
0.63	0.27	0.63	0.43	0.62	0.86	[0.63;0.64] (370.2)	-0.03	0.45	ŷ = 0.511 x IC + 1,004,980	0.91	4,082,269
0.60	0.42	0.58	0.45	0.54	0.70	[0.60;0.61](97.7)	0.77	0.41	ŷ = 0.485 x IC + 907,885	0.84	2,986,193
0.59	0.28	0.58	0.36	0.57	0.79	[0.58;0.59] (829.7)	0.21	0.52	ŷ = 0.631 x IC + 163,269	0.79	3,300,662
0.58	0.21	0.57	0.32	0.57	0.80	[0.58;0.59] (882.2)	0.29	0.52	ŷ = 0.499 x IC + 98,966	0.94	2,464,540
0.53	0.34	0.50	0.26	0.43	0.78	[0.52;0.53](677.3)	0.66	0.58	ŷ = 0.261 x IC + 1,276,008	0.53	3,125,679
0.66	0.43	0.66	0.50	0.64	0.83	[0.66;0.67] (210.3)	0.11	0.37	ŷ = 0.684 x IC - 67,128	0.82	1,165,491
0.72	0.44	0.72	0.50	0.72	0.93	[0.71;0.72](643.7)	-0.15	0.41	ŷ = 0.607 x IC + 757,356	0.89	3,024,742
0.82	0.62	0.84	0.58	0.84	1.12	[0.82;0.83] (246.2)	-0.32	0.37	ŷ = 0.503 x IC + 2,997,795	0.87	5,308,616
0.72	0.44	0.73	0.45	0.73	0.98	[0.71;0.72](1.007.3)	-0.13	0.44	ŷ = 0.578 x IC + 584,608	0.78	2,061,893
0.65	0.23	0.66	0.43	0.67	0.88	[0.65;0.66](617.3)	-0.18	0.47	ŷ = 0.296 x IC + 418,594	0.59	2,206,293
0.66	0.25	0.66	0.51	0.64	0.82	[0.65;0.66](283.0)	0.04	0.37	ŷ = 0.475 x IC + 717,940	0.93	1,616,569
0.62	0.36	0.61	0.35	0.60	0.85	[0.61;0.62](757.8)	0.21	0.49	ŷ = 0.418 x IC + 508,828	0.70	2,081,783
0.74	0.42	0.75	0.48	0.78	1.01	[0.73;0.75](185.8)	-0.32	0.43	ŷ = 1.037 x IC - 742,768	0.97	3,760,574
0.60	0.27	0.60	0.37	0.55	0.88	[0.58;0.62](65.0)	0.21	0.52	ŷ = 0.858 x IC - 47,538	0.86	250,338
0.67	0.39	0.67	0.50	0.67	0.84	[0.66; 0.67] (466.5)	-0.10	0.41	ŷ = 0.544 x IC + 502,788	0.81	1,529,691
0.79	0.64	0.81	0.67	0.82	0.98	[0.77;0.80] (30.8)	-0.70	0.32	ŷ = 0.814 × IC - 38,268	0.97	471,341
0.69	0.41	0.68	0.53	0.67	0.87	[0.68;0.70](74.6)	0.21	0.38	ŷ = 0.571 × IC + 156,549	0.95	635,814
0.60	0.37	0.59	0.40	0.54	0.78	[0.59;0.61](59.5)	0.51	0.48	ŷ = 0.658 x IC + 7,977	0.83	195,144
0.59	0.45	0.58	0.33	0.64	0.78	[0.57;0.60] (45.8)	0.07	0.44	ŷ = 0.567 x IC + 136,226	0.65	1,271,530

News from IVSC

IVSC AGM 2022

The IVSC AGM returns as an in-person event this year from 14–16 September at the Renaissance, Fort Lauderdale, Florida. This is the first physical meeting of the IVSC AGM since Singapore in 2019 with the event staged as a virtual forum during the period of the pandemic restrictions. The AGM will take place over three days, during which all the IVSC's technical standards boards, Membership and Standards Recognition Board (MSRB), Advisory Forum and Board of Trustees will meet to progress their respective work programmes. Many of the IVSC's member organisations will also send representatives or delegations to participate in the Advisory Forum programme, which brings together valuation stakeholders including the major VPOs from around the world. You can register to attend the AGM in person through the IVSC website. Alternatively, you can join two elements of the programme virtually: 1) The standards board's updates session is open to anyone and takes place on Thursday, 15 September (15:00–16:15 EDT) and 2) the formal AGM session, which is open to representatives of IVSC member organisations and which will include updates from all IVSC boards, will take place on Friday, 16 September (13:00–14:00 EDT).





Latest IVSC Perspectives Papers

Unlocking the potential of ESG

The latest IVSC Perspectives Paper "Unlocking the Potential of ESG" explores the findings of our recent survey, looking at the extent to which ESG is being considered by different stakeholders in the valuation process. To understand evolving market needs, the IVSC's <u>ESG Working Group</u> carried out a survey of investors, businesses, and valuers concerning all types of valuations in order to gain an understanding of the stage of evolution and development of each, in their consideration of ESG components. You can download the Perspectives Paper form the IVSC website, <u>here</u>.

Defining & Estimating Social Value

Following the publication of our first <u>Perspectives Paper in this series on Social Value</u> in November 2020, the IVSC's Social Value Working Group has issued a further paper to explore some of the issues in more detail. This paper examines whether Social Value can be a basis of value; the difference between Social Value and the Social component of ESG; and whether the existing valuation principle of highest and best use can apply to Social Assets and Social Value. Intuitively, we all know that parks, nature reserves, hospitals, graveyards, businesses and other assets have value to their local community, but unless they are the owner we rarely try to calculate that value. Here, instead of considering social value generated by an asset from the perspective of the asset owner, as much ESG valuation work does, we look at social value as the value to the users and other non-owner stakeholders – the value to society of a business, public resource or other asset. You can download the Perspectives Paper form the IVSC website, <u>here</u>.

Europe Board meets in Brussels

The IVSC's Europe Board comprises valuation leaders from across the European continent and is tasked with leading significant outreach and engagement projects under the sponsorship of the IVSC. The Board was established in early 2020 and has met monthly, virtually, as well as three times in-person during its existence. It has led initiatives to help promote the importance of international standards and valuation professionalism with various stakeholder communities, including academia, financial regulators, legal and judicial professionals, and with policymakers and legislatures. The Board held meetings with representatives from the Bank of Spain and the Spanish financial markets regulator (CNMV) when it met in Madrid in October 2021. During its most recent meeting in Brussels, in August 2022, the Board held meetings with a Deputy Head of Unit at DG FISMA, responsible for financial stability; the European Mortgage Federation; and with representatives of local VPOs.





IVSC-IVAS Business Valuation Conference 2022 (hybrid)

Now in its sixth year, the IVSC-Institute of Valuers and Appraisers, Singapore (IVAS) Business Valuation Conference has become established as the leading BV conference in Asia. This year's conference is being run as a hybrid event, giving attendees the option to join in person (at the Marina Bay Sands Convention Centre, Singapore), or virtually through a dedicated Live Streaming platform. The theme for the conference, 'Navigating New Frontiers to Create Sustainable Value'. As the world emerges from the pandemic, economies are adopting new strategies to safeguard sustainability. Governments are implementing ESG policies, and businesses are changing their business models to create sustainable value. As today's business environment evolves, Business Valuation professionals need to determine how ESG factors can be measured as

intangible assets, and how to create other forms of intangible assets to impact enterprise value. Speakers include Vice-Chair, International Sustainability Standards Board (ISSB), Sue Lloyd, and Singapore's Second Minister for Finance and National Development, Indranee Rajah. More information including details of how to register can be found <u>here</u>.

Richard Stewart appointed Chair of the IVSC's Business Valuation Board

Sydney-based PwC Partner, Richard Stewart OAM, has recently been appointed Chair of the IVSC's <u>Business Valuation Board (BVB</u>). Richard joined the Board as a member in March 2019 and takes over from Andreas Ohl who steps down after a seven-year contribution to the IVSC's standard setting boards. Richard will also take over from Andreas as the BVB representative on the Standards Review Board which oversees the IVSC's standards agenda.



News from EACVA



New Milestone: 1,000 Individual Members

EACVA is excited to announce that we've reached a major milestone – we now have *1,000 members*! This is a monumental achievement for our association. EACVA was founded in 2005, based in Frankfurt/Germany and supports business valuation professionals in Europe. We are grateful to our partner association NACVA for supporting us in such a professional manner. After 17 years, EACVA has reached a new milestone and want to thank all our members for the trust that you have placed in us. In return we continue providing the best association experience

possible for our members. This means providing substantive and practical practitioner support for all levels of need, credentialing business valuators in Europe with the globally recognized Certified Valuation Analyst (CVA) designation, publishing business valuation magazines for practitioners, supporting our members with information and data sources, and much more. Our CVA trainings, seminars, webinars along with our International Business Valuation Conference, are excellent ways to obtain continuing professional education and expand your professional network. Learn more about EACVA and membership benefits...

EACVA's 15th International Business Valuation Conference 3 – 4 November 2022 in Vienna

The major networking event for our European members is our Annual European Business Valuation Conference, which will now take place for the 15th time on *3 and 4 November 2022 in Vienna, Austria,* one of the most beautiful cities in Europe. This year's conference will again provide an exciting learning opportunity for more than 350 attendees to hear from some of the most renowned speakers in the business valuation field while connecting and networking with other valuation professionals. Keynotes will be held by *Prof. Ulrich Blum* on Outright Economic Warfare: Can It Be Contained? and *Prof. Bradford Cornell* on ESG and Valuation. Besides this, we will offer *sessions* in English on topics like:



- Challenges to Market Value Alexander Aronsohn, FRICS, IVSC, UK
- Special Cases in the Valuation of Venture Capital Investments Dr. Christoph Engel, CFA, CVA, FRM, Accuracy, Germany
- Peer Group Selection Using Artificial Intelligence Technology *Prof. Stefan O. Grbenic, StB, CVA*, University of Technology Graz, Austria and *Prof. ddr. Timotej Jagric*, University of Maribor, Slovenia
- Accounting Insights for Valuation Professionals: Red Flags and More *Dr. Kenneth Lee, CFA*, the London School of Economics and Political Science, UK
- Diving into Deals: Gain a Deeper Understanding of SME Transaction Databases and How to Use Them Effectively *Lari Masten, MSA, CPA, ABV, CFF, CVA, CPVA, ABAR, MAFF,* Masten Valuation, USA
- Betanomics 2022: Some Dos and Don'ts of Dealing with Capital Market Data *Prof. Dr. Matthias Meitner, CFA*, International School of Management / VALUESQUE, Germany
- Time to Get Tangible about Intangible Assets Henk Oosterhout, PhD, MBA, Kroll, The Netherlands
- Leasing and Valuation: Common Pitfalls and How to Avoid Them Dr. Timo Willershausen, PwC, Germany

At the end of the first conference day, we cordially invite all conference participants to the Networking Dinner at the magnificent Garden Palace of the princely family of Liechtenstein. It will be a perfect opportunity to network with other business valuation professionals and speakers. The number of participants is limited. Learn more about our conference...



Certified Valuation Analyst (CVA) Training 7 – 11 November 2022 in Frankfurt

With the *Certified Valuation Analyst (CVA)* EACVA has established an internationally recognized qualification for valuation professionals in Europe. CVA training is aimed at all professional groups who provide business valuation services, including CPA's, tax consultants, auditors, controllers, corporate finance consultants, financial analysts, investment managers, M&A consultants, employees in accounting, etc. CVA Training delivers the most com-

prehensive and complete foundational training teaching to the Core Body of Knowledge for International Business Valuations (BOK) on how to value business enterprises, on business valuation methodologies, approaches, and case studies, professional standards and ethics, specialty areas of business valuation and valuation of intangible assets practice. It is a five-day live training program (45 hours of class instruction) with an experienced team of renowned instructors who will prepare you to pass the Certified Valuation Analyst (CVA) exam. The certification process consists of two parts: the CVA proctored exam and the experience threshold (BV report).

The *next international in-person CVA training* for European valuation professionals will be held on 7 – 11 November 2022 (five-day training / 45 hours of continuing training credit) in Frankfurt, Germany. *The number of participants is limited!* Learn more about the CVA program...

Around the Valuation World (AVW) International



THE DEFINITIVE SOURCE FOR INDUSTRY NEWS AND UPDATES

To keep our members up to date on industry trends and updates for the business valuation profession on international valuation issues from leading business valuation experts, the Global Association of Certified Valuators and Analysts (GACVA) launched *a new exclusive member benefit Around the Valuation World International* in January 2021.

The live monthly webcast series is free to view for all members worldwide, so they can be confident that their knowledge is current and accurate at all times. AVWI is designed for business valuation and financial litigation practitioners who wish to advance their skill set and remain current with trends and activities in the financial consulting niches. The webcast is hosted by chapter leaders from Europe (*Wolfgang Kniest, CVA* I EACVA), Canada (*Andrew Neuman, CPA, CA, CFE, CA.IFA, CFF, CVA*) and India (*Pratik Shah, CVA* I ACVA). They interview and engage in technical dialogue with the experts during the live webcast and moderate attendees' questions.

Upcoming events:

- 26 September 2022: Early Stage Valuation Antonella Puca, CFA, CPA/ABV
- 24 October 2022 Valuation of Wineries and Craft Beverage Companies Joseph Orlando, ASA
- 28 November 2022: Kroll Cost of Capital New Beta Module Carla S. Nunes, CFA
- 19 December 2022: Business Valuation Déjà Vus Chris Mercer, CFA, ABAR, FASA

Learn more about AVWI and other benefits of EACVA membership...

IVSC's VPOs introduce themselves:

RICS is a global professional body promoting and enforcing the highest international standards in the valuation, management, and development of land, real estate, construction, and infrastructure. RICS works at a cross-governmental level, delivering a single and global standard, with over 130,000 qualified professionals. Within the valuation sector, RICS has about 30,000 valuation professionals in over 130 countries.



Explain in one sentence what your VPO does!

Through global standards, leading professional progression and trusted data and insight, RICS promote and enforce the highest professional standards in the development and management of land, real estate, construction, and infrastructure; RICS valuation professionals' expertise covers valuations of real estate (commercial and residential), businesses, intangible assets including intellectual property, machinery and equipment, and financial instruments.

Please tell us about your member structure!

There are three types of RICS qualification):

- Associate (AssocRICS) is the entry-level qualification and offers the chance to progress to full chartered status
- MRICS (Member) is the most common way to qualify as most people already have surveying-related qualifications and work experience.
- FRICS (Fellow) is defined as 'An honoured class of membership awarded on the basis of individual achievement within the Profession.' All members (MRICS) are eligible to apply for fellowship. Candidates will need to show how their career experience demonstrates four out of twelve professional characteristics.

What are your member benefits?

Members are part of a global professional network and benefit from a wider industry recognition. Professional standards, ethical guidance, sector-specific advice and regulation of members ensure the utmost level of professionalism across the built and natural environment. The RICS qualification means being part of a network for professional connections among peers committed to respecting the same rules.

What are the most challenging valuation topics for your members right now?

Impact of ESG on valuation; AVM development; relevant public data and insights.

What is your role within the VPO?

Sander Scheurwater and Gina Ding are part of the Public Affairs team sitting under the Profession & Advocacy Directorate of RICS. Sander's remit overlook Americas, Europe, Middle East and Africa whereas Gina's focus is on Europe.

Why are you VPO member with IVSC?

RICS Valuation – Global Standards ('Red Book Global Standards') and RICS Guidance Notes are issued by RICS as part of our commitment to promote and support high standards in valuation delivery worldwide. The RICS Red Book details mandatory practices for RICS members undertaking valuation services and it adopts and applies the International Valuation Standards (IVS) published by the International Valuation Standards Council (IVSC).

RICS business valuers provide valuation services for financial reporting, transactions, litigation, and tax reporting purposes. Additionally, RICS works with various professional bodies globally in (1) the development of technical guides, such as the Mandatory Performance Framework, the Application of the Mandatory Performance Framework, and International Valuation Glossary of BV Terms as well as (2) the dissemination of current industry trends and insights via webinars, and (3) the development of ESG thought leadership. •



EBVIN The European Business Valuation Magazine



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