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Determinants in the Valuation of Streaming Companies and Streaming Platforms

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ABSTRACT

The triumph of streaming platforms has its origins in the last millennium. Mobile communications standards and, thus, transmission bandwidths continued to develop. At least to the same extent, physical media carriers lost massive importance, eroding the business models of traditional media companies and causing industries to converge. Internet and media companies, therefore, felt compelled to acquire streaming platforms or entire companies operating such platforms. The paper focuses on the valuation of streaming companies and streaming platforms, which can be regarded as definable parts of a company: What is the maximum price that the rational presumptive acquirer of such a company (part) can pay for them without putting himself in a worse position by acquiring it than by not acquiring it? The value to be determined has the character of a decision limit and depends on the target system and the decision field of the valuation subject. The valuation of a streaming company is divided into the following three steps in a decision-oriented sense: 1. Delimitation and quantification of the relevant future successes (Determination of relevant data) 2. Transformation of the determined data into a decision value 3. Weighing up (subjective) decision value and (objective) price. The aim of this paper is to support valuation steps 1 and 2. To this purpose, the paper primarily presents the fundamentals of valuation and the delimitation and quantification of the relevant future earnings. The main task of valuation is the transformation of the qualitative and quantitative information on future successes determined from well-founded forecasts into a value that fulfills the function pursued by using the future performance value. This value is ultimately intended to support the decision-making subject's decision.

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The unbridled success of streaming platforms

The triumph of streaming platforms has its origins in the last millennium. At least to the same extent, physical media carriers lost massive importance, eroding the business models of traditional media companies and causing industries to converge. Internet and media companies, therefore, felt compelled to acquire streaming platforms or entire companies operating such platforms. For example, the streaming platform "YouTube" was sold by its founders to the Google group for 1.65 billion US dollars in 2006 (United States Securities and Exchange Commission, 2006; for significance of the valuation for unicorns see Menon & James, 2022, p. 101). Numerous corporate acquisitions and mergers followed in the field of internet and media companies with regard to streaming platforms. In 2021, for example, the merger of the streaming services of AT&T and Discovery created a much larger streaming service (United States Securities and Exchange Commission, 2021).

The paper focuses on the valuation of streaming companies and platforms (valuation object). In the sense of a valuation within the framework of the so-called decision function, the question to be answered is: *What is the maximum price that the rational presumptive acquirer of such an object (company or of a part of it) can pay without putting himself in a worse position by acquiring it than by not acquiring it?*

The value to be determined has the character of a decision limit and depends on the target system and the decision field of the valuation subject (Hering et al., 2014, p. 35). The valuation of a streaming company is divided into the following three steps in a decision-oriented sense:

1. Delimitation and quantification of the relevant future performance (Determination of relevant data)
2. Transformation of the determined data into a (subjective) decision value
3. Weighing up (subjective) decision value and (objective) price.

The explanations concentrate on the support of valuation steps 1 (sections 3.1 to 3.3) and 2 (section 3.4) because the 3rd step cannot be formalised (Hering, 2021, p. 12). To this end, the *second chapter* primarily presents the fundamentals of (functional) valuation (Matschke & Brösel, 2021, p. 37) and the basic principles for delimiting the future performance relevant to valuation (Hering et al., 2015, p. 1) against the backdrop of the streaming industry.

The *third chapter* deals with the delineation and quantification of the relevant future performance (step 1 of the valuation). In this context, the special characteristics of the streaming market exacerbate the already existing determination problems resulting from the uncertainty of the future. This is followed – as a brief digression – by the transformation of the qualitative and quantitative information on future performance determined from well-founded forecasts into a value that fulfills the (decision) function pursued by the valuation (step 2 of the valuation) (Rapp & Olbrich, 2020). This value should ultimately be intended to support the decision-making subject's decision.

The results are summarised in the concluding fourth chapter.

Our analysis is based on a comprehensive evaluation of the literature. It should be noted that there are no relevant publications in the specific field of the valuation of streaming companies based on functional valuation theory. Our paper is, therefore, based on the fundamental works of functional valuation theory (Matschke, 1969; Matschke, 1971; Matschke, 1972; Matschke, 1975; Matschke,

1976; Matschke & Brösel, 2021) and the valuation of telecommunications companies (Dechant & Trost, 2001; Dechant & Braßler, 2003). Current developments in this context (Bylund et al., 2022; Kintzel & Toll, 2022) and the context of company valuations have also been included in this paper; however, these relate to companies with other fields of activity and have national characteristics (Drábek, 2022; Menon & James, 2022; Oh & Park, 2022; Qiu et al., 2022; Shuangying et al., 2023; Widati et al., 2023).

Valuation basics and valuation-relevant special features

On the basics of functional business valuation theory

The controversial views of objective (Mellerowicz, 1952; Viel, 1955; Lackmann, 1962) and subjective (Busse von Colbe, 1957; Münstermann, 1966; Käfer, reprint of essays in 1996; the necessity of the subject reference in the context of valuations has already been recognised by Schmalenbach, 1917/1918, p. 4) valuation theory were ultimately overcome 50 years ago by the concept of functional business valuation, which was developed in Germany (Matschke, 1969; Matschke, 1971; Matschke, 1972; Matschke, 1975; Matschke, 1976; Sieben, 1976; Goetzke & Sieben, 1977; Matschke, 1979). The central point of this school of thinking is the purpose-dependency (Moxter, 1983, p. 5) of the company value. The value of a company is determined with reference to the expectations and plans of the concrete party interested in the valuation, explicitly taking into account the pursued task of the company valuation. The company does not merely have a specific value for each interested party in the valuation but can also have a quite different value depending on the task (Matschke, 1995, p. 973). The company value and the procedure for its determination do not exist.

Only if the respective function of the valuation is taken as a starting point can the necessary procedural rules for determining the value be derived in a meaningful way (Matschke, 1981, p. 115). Functional valuation differs from the so-called main functions, which include decision (Hering, 1999; Matschke & Brösel, 2021, p. 53), mediation (Matschke, 1971; Matschke, 1979; Moxter, 1983, p. 22; Follert et al., 2018, p. 326; Matschke & Brösel, 2021, p. 213), and argumentation (Matschke, 1976; Matschke & Brösel, 2021, p. 259), and the types of value affiliated with them. In the explanations that follow, only the decision value derived from the decision function is considered.

The decision value indicates to a decision-making subject, given a system of targets or preferences and given a decision field, under which conditions or under which complex of conditions the realisation of a certain intended action just does not reduce the level of target fulfilment achievable without this action (Matschke, 1972, p. 147). In other words, the decision value is regarded as the outermost concession limit of the valuation subject's in a given conflict situation. The decision value is thus based on the investment-theoretical principles of target- and decision-field-relatedness, cf. on the necessary investment-theoretical foundation of valuations (Hering, 1999, p. 11).

If a valuation targets the change of legal relations and only the amount of the purchase price is of importance for the agreement of the conflict parties, the decision value corresponds to the marginal price of a negotiating party in this conflict situation. From the perspective of the presumptive buyer, the decision value as the upper price limit is precisely the amount that he can

pay without having to accept an economic disadvantage due to the purchase (Matschke, 1969, p. 59). In negotiation situations, this critical amount should undoubtedly be a "hidden value" in view of the strength of one's own negotiating position (Sieben, 1988, p. 86).

The *significant principles* (Matschke & Brösel, 2003) underlying functional valuation theory are, in addition to the principle of purpose dependence, the principles of *overall valuation*, *future orientation,* and *subjectivity* (Brösel et al., 2012, p. 244):

- With regard to the *principle of overall valuation* (Auler, 1926/1927, p. 42; Ballwieser & Leuthier, 1986, p. 548), the sum of the individual values of the assets of this streaming company is not relevant for valuation; rather, it is necessary to consider the streaming company at disposal in the context of the conflict situation as an economic unit. In the case of an isolated valuation of the individual operational values, there is the danger of neglecting positive but also negative combination effects within the valuation object to be considered as a unit because the sum of the individual values does not have to be identical with the total value of the valuation object (Münstermann, 1966, p. 18). However, it is not impossible that the sum of the individual values does correspond to the overall value.
- The *principle of future orientation* (Ballwieser & Leuthier, 1986, p. 548) states with regard to the valuation of streaming companies that only the benefit that the valuation object will provide in the future is relevant for the valuation subject. The merchant gives nothing for what has been (Münstermann, 1966, p. 21). In the valuation of product or programme innovations, such as new content that has already been produced but not yet been made available, the problem arises that a trend extrapolation based on the results of previous periods cannot be used as a forecasting tool at all, or only to a very limited extent. The future orientation results in the *problem of uncertainty* (Keuper, 2002, p. 458) because the exact future benefit of the valuation object (streaming company) and all future action alternatives and consequences are not known to the valuation subject at the time of valuation.
- In accordance with the *principle of subjectivity* (Moxter, 1983, p. 23), the determination of the value of streaming companies requires the fictitious embedding (in the case of a presumptive buyer) or fictitious divestment (in the case of a presumptive seller) of the valuation object in or from the plans of the valuation subject (The subject reference has so far been largely ignored in Anglo-Saxon valuation theory, cf. Olbrich, 2000, p. 458.). Thus, the target system and the decision field of the valuation subject are of significance. Accordingly, the value is determined by the targets pursued by the valuation subject, the financial and real economic options and restrictions available from the decision-making field, and the use planned for the valuation object. Furthermore, it is a consequence of the principle of subjectivity that the individual positive and negative compound effects expected by the valuation subject must be considered when determining the value. Due to different plans, synergy potentials (Moxter, 1983, p. 91; Weber, 1991; Olbrich, 1999, p. 20) as well as utilisation possibilities, and restrictions, streaming companies have an individual value for each valuation subject. Even equal utility expectations of different valuation subjects do not lead to equal company values if, for example, the alternative capital utilization options of the valuation subjects differ (Ballwieser & Leuthier, 1986, p. 549).

Principles for the delimitation of future performance relevant to valuation

For the presumptive buyer, all future performance generated by the valuation object is of importance in the context of the valuation. In the case of an acquisition, the valuation object provides the valuation subject with a future benefit and thus contributes to the fulfilment of its targets. The determination of this performance from the valuation object relevant to the valuation subject is usually not the focus of valuation theory (Dechant & Trost, 2001, p. 234). This also applies to the analysis of interdependencies. Instead, the delimitation and quantification of the future performance of the streaming companies to be valued is the responsibility of the streaming industry experts.

However, the quality of a value for the streaming company determined by certain models is determined by the quality of the information and the delineated and quantified future performance provided for the valuation. If meaningful results are to be achieved with the valuation, the performance resulting from the company must be delimited and quantified appropriately. With this background, the main principles to be observed in the accrual and quantification process are now presented in the form of (Moxter, 1983, p. 75; Matschke & Brösel, 2021, p. 341)

- the principle of overall valuation,
- inflow (or distribution) principle and
- principle of synergy consideration.

In principle, for the presumptive buyer, according to the *principle of overall valuation* (Moxter, 1983, p. 75; Matschke & Brösel, 2021, p. 37), the future performance includes both financial and non-financial benefits. In addition to the cash surpluses, the acquisition of a streaming company can, for example, influence the level of recognition and the reputation of a valuation subject. Due to the lack of quantification possibilities, the assessment of non-financial benefits proves to be particularly difficult. However, based on the individual target system of the valuation subject, it is important to identify all matters of interest as far as possible and to determine their weighting (Matschke, 1975, p. 75).

In the present case, it is assumed that the interest of the valuation subjects is primarily directed towards financial advantage or a financial benefit, i.e. valuation subjects strive for an inflow, which can occur and be measured in the form of payments to the respective owners of the valuing company (withdrawals or distributions) as well as cash outflow savings of the owners. With regard to this *withdrawal target*, only the monetary advantage is to be considered relevant to the valuation in the context of the explanations and will be used to determine the (decision) value. However, this simplified assumption should not lead to neglecting or excluding non-financial advantages. Rather, in addition to the decision value, in which only financial benefits are taken into account, the non-financial benefits should also be considered by the decision maker when determining the price because the future performance basically consists of the total benefit expectations (Moxter, 1983, p. 79).

In accordance with the *inflow (or distribution) principle* (Moxter, 1983, p. 79), the decisive factor for the valuation of streaming companies is the benefit that accrues to the presumptive buyer with the acquisition of the valuation object. The owners of the valuing company (valuation subject) are interested in a financial inflow in the form of a withdrawal, payment or distribution, which is available to them to satisfy their consumption wishes in accordance with the withdrawal target

explained. This also includes savings in cash outflows. The impact of the valuation object on the satisfaction of the owners' (valuation subject) needs can be measured by the payment consequences triggered by it (Hering, 1999, p. 17). Thus, payment amounts serve as a calculation parameter for assessing the future benefit of the valuation object.

Incoming and outgoing *payments* are objectively verifiable because they are subject neither to balance sheet valuation influences nor to periodisation considerations. Both payment surpluses and payment savings can be considered as payment parameters. *Profit figures only have an influence on the valuation if they affect the amount of the payments*. The amount of the payment parameters is influenced, for example, by performance-related tax payments (Hering, 1995, p. 9).

The streaming company to be valued is interpreted as an uncertain future cash flow in the context of the valuation. The relevant cash flow that is to be attributed to the valuation object thus results from the continuously or discontinuously occurring incoming and outgoing payments (For simplification, a hypothetical discontinuous cash flow is assumed in business valuation as in investment appraisal; cf. Matschke, 1993, p. 58.). If integration effects occur during the acquisition of a streaming company, these must also be taken into account when determining future performance.

The valuation-relevant benefit stream in the sense of the (incoming) **p**ayment **s**urpluses (PS) thus results in the period t or at time t, in accordance with *the principle of synergy consideration*, from the difference of the performance to be recorded of the valuing company (valuating subject) **w**ith (PS^{wVO}) and with**o**ut (PS^{oVO}) the **v**aluation **o**bject (VO) (Moxter, 1983, p. 91):

$$PS_t = PS_t^{wVO} - PS_t^{oVO}.$$

Since the payment surpluses are always the difference between the incoming payments (including the outgoing payment savings; **c**ash **i**ncoming) CI and outgoing payments (**c**ash **o**utgoing) CO, this results in the following:

$$PS_t = \left(CI_t^{wVO} - CO_t^{wVO}\right) - \left(CI_t^{oVO} - CO_t^{oVO}\right) \text{ as well as}$$

$$PS_t = CI_t^{wVO} - CI_t^{oVO} - CO_t^{wVO} + CO_t^{oVO}.$$

In order to determine the valuation-relevant payment surpluses, it is therefore necessary to determine the incoming payments of the valuing company with (CI_t^{wVO}) and without (CI_t^{oVO}) the valuation object as well as the outgoing payments of the valuing company with (CO_t^{wVO}) and without (CO_t^{oVO}) the valuation object.

In the streaming industry, economies of scope can occur, for example, in the form of cash outflow savings for the valuing company from programme content taken over as well as from customer management and customer billing systems. Particularly when acting in new markets, a company's growth due to an acquisition can often result in an outstanding position vis-à-vis competitors; possibly with the consequence of more than just additive linking of the two company’s market shares. On the cost side, for example, a fixed cost degression can result from larger production volumes. In addition, there may also be negative economies of scope, such as "double staffing". Since the respective economies of scope are generated by the synthesis of the acquiring and the acquired company, the principle of economies of scope reflects both the principle of overall valuation and the principle of subjectivity.

Particularities of the streaming industry

Determining the cash inflows and outflows of streaming companies must be based, above all, on the products – the programme content – and the behaviour of the consumers. Forecasting involves a large number of imponderables.

Cash inflows are generated from the viewing of programme content. For this purpose, the companies try in advance to forecast the possible acceptance of the content through market research. However, in a fast-moving society it repeatedly happens that individual content develops into a (short-lived) megatrend, although not expected; conversely, elaborately produced and extensively advertised content does not necessarily succeed in achieving the required success. Another trend that is relevant for the forecast of the cash inflows is the increased willingness of customers to switch between different providers. Environmental influences can also have a significant impact on the development of cash inflows. In order to be able to generate cash inflows, companies must first invest.

These investments are partly associated with high *cash outflows*. On the one hand, the streaming company must maintain the technical infrastructure that makes it possible to withstand a large number of simultaneous requests for programme content. On the other hand, new programme content must be produced regularly, which is also associated with cash outflows.

An approach to forecasting future performance

Explanation of the procedure

The careful delineation and quantification of relevant payments by professionals operating in the streaming industry require strict adherence to the principles outlined in section 2.2 (Olbrich, 2002, p. 695). A heuristic approach to support the forecasting of future cash flows is presented below (Dechant & Trost, 2001; Dechant & Braßler, 2003). With regard to the formula presented for determining the valuation-relevant payment surpluses PS_t, this forecasting approach is divided into the components "cash inflow forecast" with a market and turnover model (to determine the respective CI_t^{wVO} and CI_t^{oVO}) as well as "cash outflow forecast" with an investment and cost model (to determine the respective CO_t^{wVO} and CO_t^{oVO}).

This approach not only intends to support the well-founded forecasting of payment surpluses. The approach also enables greater transparency of the forecasts and allows the procedures for taking uncertainty into account to gain greater significance because the effects of certain parameter constellations can be examined and shown transparently. A major focus of these remarks will be the possible collection of data.

The forecast of cash inflows (CI)

Forecasting cash inflows requires the determination of potential sales volumes – here identical to customer numbers – and product prices, which in turn form the basis for forecasting turnover figures. The approach to forecasting cash inflows is divided into the following ten steps:

Step 1: Segmentation

The first step is to segment the market. First, the individual customer segments s (e.g., customer segments by age of the target groups) must be determined. Then, for each customer segment, the size of the segment S_t^s is estimated as well as the product variants that suit the needs, such as different media use. Consumer surveys are to be carried out to develop product variants, for example.

The index t describes the respective period as the time between the points in time t – 1 and t (here one year) or the respective point in time (e.g., the stock figure "customers" refers to the end of the year).

Table 1.

Customer segmentation

Description	Variable/Formula	Method of determination
Determination of customer segments	S	Company decision
Scope of respective customer segments	S_t^s	Estimation
Product variants	Index h	Analysis

Step 2: Interdependent estimation of potential market size and possible sales prices

In the second step, the potential market size and the possible sales prices for the respective segments s are determined by an interdependent estimation. To simplify matters, the quantity-specific consideration of the customer distribution among the product variants is dispensed with here, which corresponds to the consideration of an "average customer". This customer distribution will be included in the price and proceeds calculations at a later stage (steps 6 and 7).

Estimating *potential penetration rates* PP_t^s is usually a big challenge in the case of product innovations because, in addition to the supposed demand, technical restrictions (e.g., bandwidth in more remote areas) and limitations resulting from company decisions must also be taken into account, among other things. It is often even necessary to model several multiplicatively linked penetration rates. Current as well as past penetration rates can be taken from relevant trade journals or determined by special studies, for example. It should be noted, however, that these data provide only very limited information on penetration rates more than one year in the future. Penetration rates from different sources often differ considerably. Even special studies sometimes do not clearly delineate the market segments and leave open whether legal, technical or other restrictions have already been taken into account. Also, when transferring penetration rates from "pioneer countries" to the market under consideration, maximum caution is required with regard to different habits and specifics. Against this background, a classical estimation is a preferable method (Koppelmann, 2001, p. 118). Each penetration rate is to be estimated by identifying and ranking the product drivers (e.g., monthly usage time, speed and convenience of data transmission, status, price) and their characteristics in the segment categorised by target groups.

Penetration rates are to be measured in close coordination with the expected prices. In the meticulous analysis of customer needs necessary for this, the focus is on the question: "Which target groups have which benefits and how high is their willingness to pay for them?"

Consumer surveys are an indispensable source of information, especially for estimating market prices $p_{h,t}^{s,M}$ and $g_{h,t}^{s,M}$. The index M used clearly shows that – in contrast to the company-specific variables used below (index U) – these are market-specific variables.

Table 2.
Interdependent estimation of potential market size and possible sales prices

Description	Variable/Formula	Method of determination
potential penetration rates	$PP_t^s \in [0;1]$	*Estimation*
Segment-specific sales prices		
– monthly fees	$p_{h,t}^{s,M}$	Estimation
– one-time connection fees	$g_{h,t}^{s,M}$	Estimation

Step 3: Identify the potentially addressable customer segments

The determination of the potentially addressable customer segments is now carried out in the third step by multiplying the respective customer segments S_t^s by the corresponding potential penetration rates PP_t^s.

Table 3.
Identifying the potentially addressable customer segments

Description	Variable/Formula	Method of determination
Number of potentially addressable customers per segment	$S_t^s \cdot PP_t^s$	Calculation

Step 4: Determine a tariff and supply model

Strategic decisions are made by the companies as to whether the entire market or only sub-markets are to be addressed and how quickly the target groups are to be expanded. The degree to which customers can be addressed is formally captured by means of a so-called segment-specific potential exploitation coefficient $\alpha_t^{s,U}$ with $\alpha_t^{s,U} \in [0;1]$. Influencing factors include the company's mission statement, its willingness to take risks and cooperate, the lucrativeness of the market potential, the level of investment and the financial situation, including the company's debt potential. Mainly in the early days of market penetration, experience has shown that a rapid entry into the nationwide mass market often overburdens the company's processes, which manifests itself, among other things, in poor service or limited accessibility to programme content.

Finally, the number of addressable customers per segment results from the size of the customer segment S_t^s, the penetration rate PP_t^s and the potential utilisation coefficient $\alpha_t^{s,U}$.

In addition, within the framework of the tariff and offer model, the price positioning – represented here by segment-specific price adjustment coefficients ($q_{h,t}^{s,U}$) – vis-à-vis the competitors must be determined (Kotler et al., 2017, p. 46). In practice, calculations must be carried out for various such tariff and supply models, taking into account the dynamics of market prices depending on the company's pricing decision. The corresponding product segment-specific monthly prices $p_{h,t}^{s,U}$ and

one-time connection fees $g_{h,t}^{s,U}$ can be derived from the market prices $p_{h,t}^{s,M}$ and $g_{h,t}^{s,M}$ estimated in step 2 and via a company-specific price adjustment coefficient $q_{h,t}^{s,U}$.

Table 4.
Determination of a tariff and supply model

Description	Variable/Formula	Method of determination
Potential utilisation coefficient, so that:	$\alpha_t^{s,U}$	Company decision
Number of addressable customers =	$S_t^s \cdot PP_t^s \cdot \alpha_t^{s,U}$	Calculation
Price adjustment coefficient, so that:	$q_{h,t}^{s,U}$	Company decision
product segment-specific monthly prices =	$p_{h,t}^{s,U} = q_{h,t}^{s,U} \cdot p_{h,t}^{s,M}$	Calculation
Product segment-specific one-time connection fees =	$g_{h,t}^{s,U} = q_{h,t}^{s,U} \cdot g_{h,t}^{s,M}$	Calculation

Step 5: Forecasting the market share and calculating the number of customers

The forecast of the company's market share in the respective (sub-)segment $MA_t^{s,U}$ is carried out in step 5 with recourse to the potentials targeted in step 4. The determination of the potential market share, which depends on the already determined tariff structure, should be based on strategic analyses of the company and the main competitors of the relevant strategic group.

Objects of analysis include previous market shares, product strategy and portfolio, distribution and production capacity as well as company cooperations. Subsequently, the company's segment-specific customer numbers $m_t^{s,U}$ (equivalent to product volume) can be calculated from the size of the customer segment S_t^s, the penetration rate PP_t^s, the potential exploitation coefficient $\alpha_t^{s,U}$ and this market share $MA_t^{s,U}$.

Table 5.
Forecast of market share and calculation of customer numbers

Description	Variable/Formula	Method of determination
Market share	$MA_t^{s,U}$	Forecast
Number of customers	$m_t^{s,U} = S_t^s \cdot PP_t^s \cdot \alpha_t^{s,U} \cdot MA_t^{s,U}$	Calculation

Step 6: Forecasting the distribution of demand

The sixth step is to forecast the previously neglected distribution of demand (hereafter referred to as demand distribution) $\beta_{h,t}^{s,U}$ among the different product variants of the respective segments.

Table 6.
Forecast of demand distribution

Description	Variable/Formula	Method of determination
Company-specific demand distribution	$\beta_{h,t}^{s,U}$ with $0 \leq \beta_{h,t}^{s,U} \leq 1, \quad \sum_h \beta_{h,t}^{s,U} = 1$	Forecast

Step 7: Calculation of (average) prices

Following the determination of the demand distribution $\beta_{h,t}^{s,U}$, this and the product variant-specific monthly prices $p_{h,t}^{s,U}$ as well as the connection fees $g_{h,t}^{s,U}$ can be used to calculate the average monthly price $p_t^{s,U}$ as well as the average connection fee $g_t^{s,U}$, which can also be characterised as company-specific average prices.

Table 7.

Calculation of (average) prices

Description	Variable/Formula	Method of determination
Company-specific average monthly price	$p_t^{s,U} = \sum_h \beta_{h,t}^{s,U} \cdot p_{h,t}^{s,U}$	Calculation
Company-specific average connection fee	$g_t^{s,U} = \sum_h \beta_{h,t}^{s,U} \cdot g_{h,t}^{s,U}$	Calculation

Step 8: Turnover forecasts

With these quantities, the forecast annual turnover from monthly and one-time connection fees can then be determined in total for the respective segment and cumulatively across all segments. If the periods under consideration t correspond to one year, the monthly prices $p_t^{s,U}$ must be multiplied by twelve and the average annual number of customers in order to calculate the annual turnover from monthly fees $UP_t^{s,U}$. For the calculation of the annual turnover from one-time connection fees $UG_t^{s,U}$, the connection fees $g_t^{s,U}$ are to be multiplied by the annual increase in customer numbers.

Table 8.

Turnover forecasts

Description	Variable/Formula	Method of determination
Annual turnover from monthly fees	$UP_t^{s,U} = \frac{m_t^{s,U} + m_{t-1}^{s,U}}{2} \cdot p_t^{s,U} \cdot 12$	Calculation
Annual turnover from one-time connection fees	$UG_t^{s,U} = (m_t^{s,U} - m_{t-1}^{s,U}) \cdot g_t^{s,U}$	Calculation
Annual turnover per segment	$U_t^{s,U} = UP_t^{s,U} + UG_t^{s,U}$	Calculation
cumulative annual turnover	$U_t^U = \sum_s U_t^{s,U}$	Calculation

Step 9: Forecasting the average payment shift

Before reconciling the determined turnovers into the payments, the payment deferral z and the payment default $x \in [0;1]$ are to be forecast. For simplicity, both variables are assumed to be constant over time.

Table 9.
Forecast of average payment deferral and payment default

Description	Variable/Formula	Method of determination
Days until receipt of payment	z	Forecast
Payment default	x	Forecast

Step 10: Calculation of cash inflows

In a final step, a cash inflow forecast is now derived from the sales forecast – taking into account the average payment deferral and the average payment default rate.

Table 10.
Calculation of cash inflows

Description	Variable/Formula	Method of determination
Cash inflows	$CI_t^U = \left(U_{t-1}^U \cdot \frac{z}{365} + U_t^U \cdot \frac{365 - z}{365}\right) \cdot (1 - x)$	Calculation

The forecast of cash outflows (CO)

The approach to forecasting cash outflows presents a methodology that reliably supports the transition from a performance-based view to a payment-based financial perspective. The following aspects must be taken into account when collecting data:

- Since payment figures are relevant in the valuation, the calculated costs must be adjusted for non-cash components (e.g., depreciation). For example, depreciation is taken into account via the investment cash outflows. For a valuation after taxes, on the other hand, depreciation would have to be applied in a modified form.
- In general, the unit cost rates of the variable costs are not constant but are determined by the sales volume due to economies of scale on the procurement and production side.
- Fixed costs are also only considered fixed within certain sales volume ranges and must be modelled accordingly as stepped fixed costs (and thus also as dependent on sales volume).

Step 1: Identification of the value chain with its individual value chain links

Due to the complexity of the network of costs to be forecast, it makes sense to carry out a more differentiated cost categorisation initially. This involves identifying the individual value creation links along the value chain. In the present decision-making situation, the development and production of programme content, the creation of the technical infrastructure, marketing, sales, order processing and customer support, for example, can be considered as a value chain link. For each individual value chain link, the various components leading to cash outflows are to be identified and – as described below – categorised and estimated. For reasons of simplification, the following formal description does not include the indices for the respective value added element and for the year t under consideration.

The cash outflows to be determined can be divided into cash outflows relating to items to be found in the balance sheet (hereafter referred to as investment cash outflows) and cash outflows relating to current costs affecting cash outflows. While the investment cash outflows are now

represented with the designation I and i, the current costs affecting cash outflows are represented with K and k, whereby the lower-case letters designate the investment cash outflows and the costs affecting cash outflows per unit. After subdivision into variable (v) and stepped fixed (sf) quantities, the costs affecting cash outflows and the investment cash outflows amount to:

$$K = k_v(m) \cdot m + K_{sf}(m) \text{ and } I = i_v(m) \cdot m + I_{sf}(m).$$

If there is a relatively large block of additional cash costs and investment cash outflows to be allocated, it is advisable to subdivide them into directly triggered cash costs and investment cash outflows (index "d") and additionally utilised cash costs and investment cash outflows (index "in"). The utilised cash costs and investment cash outflows concern those cash outflows that are incurred in combination with other products and thus not exclusively by the product under consideration – in this example: technical infrastructure. It is, therefore, necessary to allocate the corresponding components according to their cause. Finally, the following decision-relevant investment cash outflows and costs affecting cash outflows can be identified:

$$I = [i_v^d(m) + i_v^{in}(m)] \cdot m + I_{sf}^d(m) + I_{sf}^{in}(m) \text{ and}$$
$$K = [k_v^d(m) + k_v^{in}(m)] \cdot m + K_{sf}^d(m) + K_{sf}^{in}(m).$$

Step 2: Determination of the individual components of the costs affecting cash outflows and the investment cash outflows

In step 2, the respective components of the costs affecting cash outflows and the investment cash outflows $k_v^d(m)$, $k_v^{in}(m)$, $K_{sf}^d(m)$, $K_{sf}^{in}(m)$, $i_v^d(m)$, $i_v^{in}(m)$, $I_{sf}^d(m)$ and $I_{sf}^{in}(m)$ are to be determined for each value creation element. The problems of obtaining information that exist in this determination mainly concern the special features of product realisation as well as the state of development of planning calculations and data pools in the company. Within this step, the most complete possible identification and estimation of the costs affecting cash outflows and investment cash outflows is supported by the analysis along the value chain.

Table 11.
Determination of the components of cash outflow costs and investment cash outflows

Description	Variable/Formula	Method of determination
Cost components affecting cash outflow	$k_v^d(m)$, $k_v^{in}(m)$, $K_{sf}^d(m)$, $K_{sf}^{in}(m)$	Analysis/estimation
Investment cash outflow components	$i_v^d(m)$, $i_v^{in}(m)$, $I_{sf}^d(m)$,$I_{sf}^{in}(m)$	Analysis/estimation
Cash outflow effected costs =	$K = [k_v^d(m) + k_v^{in}(m)] \cdot m + K_{sf}^d(m) + K_{sf}^{in}(m)$	Calculation
Investment cash outflows =	$I = [i_v^d(m) + i_v^{in}(m)] \cdot m + I_{sf}^d(m) + I_{sf}^{in}(m)$	Calculation

As already shown, cost and investment cash outflow components with a fixed character – insofar as they can be attributed to the product – usually occur in a stepped fixed form, which can then be modelled as a variable, fixed or stepped fixed depending on the frequency, the extent of the steps and the degree of simplification. In this respect, the extent to which idle capacity costs can be

sensibly reduced by other products must be taken into account in the cash outflow forecast. The precondition for this is functioning interfaces between marketing, capacity management and corporate management.

Step 3: Determining the average payment delay

Analogous to step 9 of the payment forecast, an average payment deferral needs to be taken into account here, for example, due to a payment period granted or due to payment delays.

Table 12.

Determination of the average cash outflow shift

Description	Variable/Formula	Method of determination
Days until outgoing payment	y	Company decision/forecast

Step 4: Calculation of cash outflows

The addition of the values calculated in step 2 for all value-added links – if necessary taking into account the average cash outflow shift – results in the period-related total cash outflow forecast. At this point the index t is shown again.

Table 13.

Calculation of cash outflows

Description	Variable/Formula	Method of determination
Addition of the cash outflow components =	$CO_t^{WK} = K^{WK} + I^{WK}$	Calculation
Accumulation across the value chain =	$CO_t^U = \sum_{WK} A_t^{WK,U}$	Calculation
Cash outflows =	$CO_t = CO_{t-1}^U \cdot \frac{y}{365} + CO_t^U \cdot \frac{365 - y}{365}$	Calculation

The heuristic approach presented offers assistance in determining the relevant performance in terms of the correlation already outlined: $PS_t = CI_t^{wVO} - CI_t^{oVO} - CO + CO_t^{oVO}$.

The transformation of future performance

The information on spreads, ranges and interdependencies of the future payment surpluses, which is determined taking into account the basic principles for the delineation of future performance and possibly with the help of the heuristic approach presented, forms the starting point for the transformation of this information into a value which is to serve as a basis for decision-making.

The *future performance value* FPV as a variant of the present value calculus corresponds to the present value of the future (incoming) payment surpluses (PS) of the valuation object discounted with the calculation interest rates r_t in terms of payment surpluses. The calculation interest rates serve as a benchmark and result from the best alternative use of capital of the decision-making subject. Neglecting non-financial restrictions (Brösel, 2002, p. 157), the future performance value of streaming companies or their separable company components is calculated according to the following formula of the so-called simplified valuation (Laux & Franke, 1969, p. 210):

$$FPV = \sum_t \frac{PS_t}{\prod_{\tau=1}^{t}(1+r_\tau)}.$$

The knowledge of the marginal interest rates of each period is, therefore, the basis for the decentralised application of the partial model "future performance value method". In practice, however, it is to be expected that this marginal interest rates problem will be strongly masked by the uncertainty problem (Hering, 1995, p. 173; Rollberg, 1999, p. 106; Rollberg, 2001, p. 189) that mainly arises with the determination of future performance (Adam, 1996, p. 10). Therefore, it is advisable not to commit to a specific percentage in the valuation, but to consider a range of potential marginal interest rates (Ballwieser, 2002).

Since the determined decision value should serve as a decision support to the valuation subject and the following (third) step demands a transparent information base with regard to the "consideration of (subjective decision) value and (objective) price", the uncertainty of the valuation issue in step two of the decision value determination should not be concentrated, thereby reducing information, but instead be disclosed to the fullest extent. Therefore, the use of methods for the detection of uncertainty (including sensitivity analysis and risk analysis) is obvious in the context of decision value determination (Rapp & Olbrich, 2022, p. 189). These methods create the necessary transparency with regard to the subjectively suspected consequences of a decision and, therefore, serve as a decision criterion in a vivid and comprehensible way (Matschke & Brösel, 2021, p. 77).

A summary

In the theory-based discussion of company valuations, reference is made to the involvement of industry experts with regard to the undoubtedly serious problem of obtaining data. Against this background, this article provides the basics for the valuation of streaming companies by explaining the decision function and the principles of functional valuation theory. The focus is then on data acquisition and the transformation of future performance into a decision value. The delimitation and quantification of the relevant future performance is supported by means of a developed heuristic. A proceeds model as well as an investment and cost model are integrated into this. With the transparent disclosure of the parameters, variables and ultimately drivers, these models provide the basis for an adequate transformation of the future performance into the sought-after quantity, taking uncertainty into account. The approach can be extended at will, for example, by including it in complete financial plans, and has already been successfully used for other fields of application, such as the valuation of market development strategies in the fixed network business and for the valuation of business models for "application service providing".

References

Adam, D. (1996). *Planung und Entscheidung* (4th ed.). Wiesbaden.

Auler, W. (1926/1927). Die Bewertung der Unternehmen als Wirtschaftseinheit. *Welt des Kaufmanns, 8*(1926/1927), 41-46.

Ballwieser, W. (2002). Der Kalkulationszinsfuß in der Unternehmensbewertung: Komponenten und Ermittlungsprobleme. *Die Wirtschaftsprüfung, 55*(2002), 736-743.

Ballwieser, W., & Leuthier, R. (1986). Betriebswirtschaftliche Steuerberatung: Grundprinzipien, Verfahren und Probleme der Unternehmensbewertung. *Deutsches Steuerrecht, 24*(1986), 545-610.

Brösel, G. (2002). Medienrechtsbewertung. *Der Wert audiovisueller Medienrechte im dualen Rundfunksystem*. Wiesbaden.

Brösel, G., Matschke, M. J., & Olbrich, M. (2012). Valuation of entrepreneurial businesses. *International Journal of Entrepreneurial Venturing*, *4*(3), 239-256. https://doi.org/10.1504/IJEV.2012.048595

Busse von Colbe, W. (1957). *Der Zukunftserfolg*. Wiesbaden.

Bylund, L., Packard, M. D., & Rapp, D. J. (2022). From static to processual analysis: how insights from Austrian economics can advance research on public policy and entrepreneurship. *Journal of Entrepreneurship and Public Policy*, *12*(1), 32-48. https://doi.org/10.1108/JEPP-03-2022-0041

Drábek, M. (2001). Relative Valuation of Private Held Companies: Valuation Multiples in the Czech Brewing Industry. *Journal of Business Valuation and Economic Loss Analysis*, *17*(1), 65-100. https://doi.org/10.1515/jbvela-2021-0023

Dechant, H., & Braßler, A. (2003). Business-Case: Internet. In G. Brösel, & F. Keuper, (Eds.), *Medienmanagement* (pp. 65-84). Munich/Vienna.

Dechant, H., & Trost, R. (2001). Wirtschaftlichkeitsbewertung von Produktinnovationen im Telekommunikationssektor. *Journal für Betriebswirtschaft, 51*(2001), 234-242.

Follert, F., Herbener, J. M., Olbrich, M., & Rapp, D. J. (2018). Agree or Disagree? On the Role of Negotiations for the Valuation of Business Enterprises. *The Quarterly Journal of Austrian Economics*, *21*(4), 315-338. http://doi.org/10.35297/qjae.010001

Goetzke, W., & Sieben, G. (1977). *Moderne Unternehmensbewertung und Grundsätze ihrer ordnungsmäßigen Durchführung*. Cologne.

Hering, T. (1995). *Investitionstheorie aus der Sicht des Zinses*. Wiesbaden.

Hering, T. (1999). *Finanzwirtschaftliche Unternehmensbewertung*. Wiesbaden.

Hering, T. (2021). *Unternehmensbewertung* (4th ed.). Wiesbaden.

Hering, T., Toll, C., & Kirilova, P. K. (2014). Acquiring a Company: Assessing the Maximum Affordable Price. *World Review of Business Research*, *4*(3), 35-44.

Hering, T., Toll, C., & Kirilova, P. K. (2015). Business Valuation for a Company Purchase: Application of Valuation Formulas. *International Review of Business Research, 11*(1), 1-10. http://doi.org/10.21102/irbrp.2015.03.111.01

Käfer, K. (1996). Zur Bewertung der Unternehmen, Nachdruck von Aufsätzen Karl Käfers aus den Jahren 1946 bis 1973 zum 98. Geburtstag des Autors. In C. Helbling, (ed.), *Schriftenreihe der Treuhand-Kammer CXXXVI*. Zurich.

Keuper, F. (2002). Unscharfe, kapitalwertbasierte Verfahren zur Unternehmensbewertung. *Zeitschrift für Betriebswirtschaft, 72*(2002), 457-476.

Kintzel, O., & Toll, C. (2022). Company Valuation and the Nonlinear State Marginal Price Vector Model under Agency Conflicts. *Central European Journal of Operations Research*, *30*(4), 1279-1305.

Koppelmann, U. (2001). *Produktmarketing* (6th ed.). Berlin.

Kotler, P., Keller, K. L., & Opresnik, M. (2017). *Marketing-Management* (15th ed.). Hallbergmoos.

Lackmann, F. (1962). *Theorien und Verfahren der Unternehmensbewertung* (2nd ed.). Berlin.

Laux, H., & Franke, G. (1969). Zum Problem der Bewertung von Unternehmen und anderen Investitionsgütern. *Unternehmensforschung Operations Research, 13*, 205-223. https://doi.org/10.1007/BF01918289

Matschke, M. J. (1969). Der Kompromiß als betriebswirtschaftliches Problem bei der Preisfestsetzung eines Gutachters im Rahmen der Unternehmensbewertung. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung, 21*(1), 57-77.

Matschke, M. J. (1971). Der Arbitrium- oder Schiedsspruchwert der Unternehmen – zur Vermittlerfunktion eines unparteiischen Gutachters bei der Unternehmensbewertung. *Betriebswirtschaftliche Forschung und Praxis*, *23*(1971), 508-520.

Matschke, M. J. (1972). Der Gesamtwert der Unternehmen als Entscheidungswert. *Betriebswirtschaftliche Forschung und Praxis, 24*(3), 146-161.

Matschke, M. J. (1975). *Der Entscheidungswert der Unternehmen*. Wiesbaden.

Matschke, M. J. (1976). Der Argumentationswert der Unternehmen – Unternehmensbewertung als Instrument der Beeinflussung in der Verhandlung. *Betriebswirtschaftliche Forschung und Praxis, 28*(6), 517-524.

Matschke, M. J. (1979). *Funktionale Unternehmensbewertung*, Vol. II. Der Arbitriumwert der Unternehmen, Wiesbaden.

Matschke, M. J. (1981). Unternehmensbewertung in dominierten Konfliktsituationen am Beispiel der Bestimmung der angemessenen Barabfindung für den ausgeschlossenen oder ausscheidungsberechtigten Minderheits-Kapitalgesellschafter. *Betriebswirtschaftliche Forschung und Praxis, 33*, 115-129.

Matschke, M. J. (1993). Einige grundsätzliche Bemerkungen zur Ermittlung mehrdimensionaler Entscheidungswerte der Unternehmen. *Betriebswirtschaftliche Forschung und Praxis, 45*, 1-24.

Matschke, M. J. (1995). Unternehmensbewertung: Anlässe und Konzeptionen. In Corsten, H. (Ed.), *Lexikon der Betriebswirtschaftslehre* (3rd ed.)(pp. 971-974). Munich/Vienna.

Matschke, M. J., & Brösel, G. (2003). Zur Bewertung kleiner und mittlerer Unternehmen mit dem Zustands-Grenzpreismodell unter besonderer Berücksichtigung möglicher Folgen von, Basel II. In J. A. Meyer, (ed.), *Unternehmensbewertung von kleinen und mittleren Unternehmen (KMU)*. Jahrbuch der KMU-Forschung, Munich.

Matschke, M. J., & Brösel, G. (2021). *Business Valuation*. Munich.

Mellerowicz, K. (1952). *Der Wert der Unternehmen als Ganzes*. Essen.

Menon, R., & James, L. (2022). Understanding Startup Valuation and ist Impact on Startup Ecosystem. *Journal of Business Valuation and Economic Loss Analysis*, 17(1). 101-114. https://doi.org/10.1515/jbvela-2022-0020

Moxter, A. (1983). *Grundsätze ordnungsmäßiger Unternehmensbewertung* (2nd ed.). Wiesbaden.

Münstermann, H. (1966). *Wert und Bewertung der Unternehmen*. Wiesbaden.

Oh, J. & Park, H. W. (2022). Income approach to technology valuation for innovations. *International Journal of Technology Management*, *88*(2/3/4), 389-407. https://doi.org/10.1504/IJTM.2022.121500

Olbrich, M. (1999). *Unternehmenskultur und Unternehmenswert*. Wiesbaden.

Olbrich, M. (2000). Zur Bedeutung des Börsenkurses für die Bewertung von Unternehmen und Unternehmensanteilen. *Betriebswirtschaftliche Forschung und Praxis, 52*(2000), 454-465.

Olbrich, M. (2002). Zur Unternehmensnachfolge im elektronischen Geschäft. In F. Keuper, (Ed.), *Electronic Business und Mobile Business* (pp. 677-708). Wiesbaden.

Yingying Qiu, Y., Feng. F., Zhang, L. & Li, X. (2022). Uncertainty measurement and regional comparison of the technology transfer process – an empirical study based on data from 30 provinces in China. *International Journal of Technology Management*, *89*(3/4), 211-231. http://doi.org/10.1504/IJTM.2022.123735

Rapp, D., & Olbrich, M. (2020). On entrepreneurial decision logics under conditions of uncertainty: An attempt to advance the current debate. *Journal of Innovation and Entrepreneurship*, *9*(21), 1-9. http://doi.org/10.1186/s13731-020-00131-7

Rapp, D., & Olbrich, M. (2022). From Knightian uncertainty to real-structuredness: Further opening the judgment black box. *Strategic Entrepreneurship Journal*, 17(22), 186-209. http://doi.org/10.1002/sej.1443

Rollberg, R. (1999). Simultane Investitions-, Finanz- und Produktionsprogrammplanung. In H. Burchert, & T. Hering, (Eds.), *Betriebliche Finanzwirtschaft* (pp. 96-110). Munich/Vienna.

Rollberg, R. (2001). *Integrierte Unternehmensplanung*. Wiesbaden.

Schmalenbach, E. (1917/1918). Die Werte von Anlagen und Unternehmen in der Schätzungstechnik. *Zeitschrift für handelswissenschaftliche Forschung, 12*(1917/1918), 1-20.

Shuangying, C., Feng, F. & Qiyue, L. (2023). How firm's technology convergence effects market value: moderating effect of institutional contingencies in emerging markets. *International Journal of Technology Management*, *93*(1/2), 64-86. http://doi.org/10.1504/IJTM.2023.132596

Sieben, G. (1976). Der Entscheidungswert in der Funktionenlehre der Unternehmensbewertung. *Betriebswirtschaftliche Forschung und Praxis*, *28*(1976), 491-504.

Sieben, G. (1988). Unternehmensstrategien und Kaufpreisbestimmung. In *Festschrift 40 Jahre Der Betrieb* (pp. 81-91). Stuttgart.

United States Securities and Exchange Commission (2006). Press release from 9th October 2006; available online at https://www.sec.gov/Archives/edgar/data/1288776/000119312506206884/dex991.htm.

United States Securities and Exchange Commission (2021). Press release from 17th May 2021; available online at https://www.sec.gov/Archives/edgar/data/0000732717/000119 312521162721/ d176202dex991.htm.

Viel, J. (1955). Theorie und Praxis der Unternehmensbewertung. *Der Wirtschaftstreuhänder*, *4*(1955), 57-59.

Weber, E. (1991). Berücksichtigung von Synergieeffekten bei der Unternehmensbewertung. In J. Baetge, (Ed.), *Akquisition und Unternehmensbewertung* (pp. 97-115). Düsseldorf.

Widati, S., Purwanto, P., & Putri, V. N. (2023). Financial Performance Analysis Before and After the Rise of Digital Companies (Case Study in the Transportation, Banking and Manufacturing Sector Listed on the Indonesia Stock Exchange). *New Challenges in Accounting and Finance*, *9*, 13-25. https://doi.org/10.32038/NCAF.2023.09.02

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