
Value, Valuation, and Valorisation

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Abstract

Knowledge valorisation is the transfer of knowledge from one party to another for economic benefit. The concept of valorisation is based on the underlying metaphor of KNOWLEDGE AS A THING. It is the same metaphor that makes it possible to talk about the value of knowledge. If knowledge is like a 'thing', then that 'thing' must have a specific value.

Value can be defined as the degree of usefulness or desirability of something, especially in comparison with other things, and is by definition subjective. Value is in the eye of the beholder. Any valuation method therefore needs to take into account this subjective nature by deliberately choosing the appropriate 'standard of value' (value to whom?) and 'premise of value' (value under what circumstances?).

There are three ways to determine the value of something of which financial valuation is the most used. In turn financial valuation can be done using a cost approach, a market approach or an income approach. In most cases the income approach is the most appropriate. However, this approach requires a number of assumptions to be made; most of which are impossible to validate. The formulas that are used in the process can be intimidating to non-experts with the danger of disguising the inherent subjective and speculative nature of any valuation of knowledge as a 'thing'.

Introduction

In the process of knowledge valorisation knowledge is transferred from one party to another. This transaction often requires an estimation of the value of the knowledge. However, knowledge is an abstract concept with no direct referent in the real world so how can one put a value on such an 'intangible'? How is it possible to talk about the value of knowledge if we can't see, touch or hear it?

This paper explores the nature of value and valuation in the context of knowledge valorisation. It does not go into the mathematics and techniques of financial valuation but provides an overview of the underlying concepts of value and valuation. This deeper understanding of what value is and what the difficulties are in estimating it is necessary to be able to do valuation or to judge the results of a valuation.

The first part of the paper explains why it is possible to talk about the value of knowledge in the context of knowledge transfer by looking at the metaphorical nature of this concept. The second part defines what value and valuation are and shows that financial valuation is but one of three ways to determine value. The last part explores the intricacies of financial valuation from which it becomes clear that any financial valuation requires a number of assumptions that are difficult to validate.

Knowledge valorisation, commercialisation and value extraction

The term 'knowledge valorisation' is a relatively new term in the discussion about the need to turn knowledge into value in the knowledge-based economy. Its origins can be traced back to the discussions within the bureaucracy of the European Commission about the Lisbon Agenda and the debate about policy measures to turn the European economy into the most dynamic knowledge-based economy in the world.

Knowledge valorisation is a new term but does it add something to the vocabulary we already have to talk about the issues of the knowledge-based economy? We use related terms like 'exploitation', 'commercialisation', and 'value extraction'. Valorisation is a French word which means 'to make useful, to use, to exploit'. Knowledge valorisation can therefore be understood as the process of making use of knowledge.

However, the term 'knowledge valorisation' is often used in a more narrow sense within the context of the discussion about the 'knowledge paradox'. This paradox describes the situation that exists in many countries in Europe, where there is a lot of knowledge – especially within universities and Technology Research Organizations – that is not used. For example, Wubben et al. (2005, p. 4) define knowledge valorisation as "*The formal transfer of knowledge resulting from basic and applied research in universities and research institutions, and from applied research and development in companies, to (other parties in) the commercial sector for economic benefit.*" Knowledge valorisation is seen as the transfer of knowledge from one party to another, a transfer that needs to result in economic benefit.

This focus on transferring knowledge gives the term a slightly different meaning from the other terms mentioned above. 'Knowledge commercialisation' can be understood as the process of making money from knowledge with or without a knowledge transfer. 'Knowledge exploitation' can be understood as creating value from knowledge, not necessarily monetary value, and is therefore similar to the concept of 'value extraction'. Sullivan (2000, p. 226) defines it as: "Value extraction involves converting the created value into a form that is useful to the organization. This often involves converting a firm's innovations into cash or some form of strategic positioning."

The metaphorical nature of knowledge valorisation

This use of the term 'knowledge valorisation' as a process of knowledge transfer between parties is based on a specific view on knowledge. Knowledge is an abstract concept that can be viewed and conceptualised in many different ways. In order to think and communicate about knowledge we use various metaphors to conceptualise it (Andriessen, 2006 forthcoming). In the definition of Wubben et al. knowledge is something that can be transferred from one party to the other. This makes sense to us because we commonly conceptualise knowledge as a 'thing' that can be created, stored, transferred, sold and used.

This KNOWLEDGE AS A THING metaphor is one of the most common used metaphors in literature to think and talk about knowledge. Alternative readings of this metaphor are the KNOWLEDGE AS A RESOURCE metaphor that is used to highlight that knowledge can be 'stored', and can be used in a process with an 'input' and an 'output', and the KNOWLEDGE AS A PRODUCT metaphor that highlights that knowledge can be 'traded' on a 'market' with 'buyers' and 'sellers'.

Metaphorical reasoning allows us to make sense of phenomena on an abstract level (the *target domain*: 'knowledge') by using characteristics from a basic level (the *source domain*: 'things', 'resources' or 'products') and is inescapable. Metaphorical reasoning is invaluable in creating new understanding and meaning. The conclusion that the concept of knowledge valorisation is based on specific metaphors for knowledge, therefore, is not meant to be in any way derogatory. However, we need to be aware that metaphors highlight certain aspects and ignore others.

Knowledge valorisation as transfer of knowledge highlights that sometimes knowledge is discovered in one context (universities, research institutions, and R&D units) and turned into money in another context (the commercial sector). It highlights that some knowledge can be transferred because it can be made explicit. It highlights that some knowledge can be used as an input resource that can be transformed into an output.

However, knowledge valorisation as transfer of knowledge ignores other characteristics of knowledge including that knowledge is often difficult to elicit and therefore difficult to transfer, that the creation and use of knowledge often happen at the same time, and that therefore the buyer and seller are often the same and the difference between input and output disappears.

The idea of knowledge valorisation is based on the metaphor of KNOWLEDGE AS A THING and this particular view results in a particular way of looking at the current problems around turning knowledge into value. It conceptualises the problem of turning knowledge into value as a problem of transfer between supply and demand. This way of defining the problem leads to specific solutions, aimed at for example matching supply and demand ('knowledge broker'), supporting demand ('subsidizing'), or increase the fit of the supply ('knowledge transfer'). What you see is what you get: the way you define a problem determines the solutions that you see.

However, we must be aware that this problem definition may not be the best definition in every case. Specifically it ignores the way knowledge is created. Within the European context it is useful to discuss the traditional linear way knowledge is created within universities and research institutions (Vasbinder and Groen, 2002). In the linear model there is basic research, performed by scientists and often financed by the government, and there is applied research in which the knowledge is applied in practice by commercial companies.

The quality standards and the reward mechanisms that are used in the context of universities and research institutions are aimed at scientific 'rigor' (defined in a very specific way) and not 'relevance'. This focus on rigor is an important underlying cause of the lack of use of knowledge. The concept of knowledge valorisation takes the linear model for granted and ignores the problem of scientific standards and reward mechanisms. To a certain extent it is a treatment of the symptoms and not the causes.

Knowledge valorisation and knowledge valuation

It is when we conceptualise KNOWLEDGE AS A THING that the value and valuation of knowledge makes sense. If knowledge is like a thing it must – like any other thing – have value and it must be possible to put a value on this 'thing'. When we want to transfer this thing called knowledge from one party to another it can be very useful to know what its value is. But what is the nature of value, what do we mean by valuation? What is the difference between valuation and measurement, and what types of methods for valuation or measurement exist?

Value

Nowadays we think about money when we talk about value, but according to Crosby (1997), it was only during the Middle Ages that money developed as a means of quantifying value. Value closely relates to the concept of "values". According to Trompenaars and Hampden–Turner (1997), values determine the definition of good and bad, as opposed to norms that reflect the mutual sense a group has of what is right and wrong. A value reflects the concept an individual or group has regarding what is desired. It serves as a criterion to determine a choice from existing alternatives.

Following the Longman Dictionary of Contemporary English (Proctor, 1978) as well as Trompenaars and Hampden–Turner (1997), value is defined as *the degree of usefulness or desirability of something, especially in comparison with other things*. So if we want to determine the value of knowledge we need to somehow find out the degree of usefulness of knowledge as a 'thing'. The term usefulness is used to emphasize the utilitarian purpose of valuation. This is in line with Rescher's (1969) value theory. He states that values are inherently benefit oriented. People engage in valuation "to determine the extent to which the

benefits accruing from realization of some values are provided by the items at issue” (pp. 61–62). However, usefulness is not the only aspect of value. Things can be valuable because they are beautiful, pleasing, or in other ways desirable, which is why the term desirability is included in the definition. Usefulness and desirability are not mutually exclusive. Things can be desirable because they are useful.

Valuation

Value is subjective so valuation requires implicit or explicit criteria, or yardsticks for usefulness or desirability. Rescher (1969) describes valuation (he uses the term evaluation) as “a comparative assessment or measurement of something with respect to its embodiment of a certain value” (p. 61). Rescher (1969) describes the importance of values for valuation as follows:

“Whenever valuation takes place, in any of its diverse forms . . . values must enter in. It is true that when somebody is grading apples, say, or peaches, he may never make overt reference to any values. But if the procedure were not guided by the no doubt unspoken but nevertheless real involvement with such values as palatability and nourishment, we would be dealing with classification or measurement and not with grading and valuation” (p. 71).

Furthermore, he states that any valuation makes use of a value scale, reflecting the fact that this value is found to be present in a particular case to varying degrees. This value scale can be an ordinal scale that reflects the varying degrees of value but does not show us the interval between the positions on the scale. A value scale can also be a cardinal scale. Such a scale is of an interval or ratio level (Swanborn, 1981). With regard to an interval level, the interval between the varying degrees of value is known, whereas on a ratio level it is also known what constitutes zero value. We can represent cardinal scales numerically. The advantage of using money as the denominator of value is that it creates a value scale at the ratio level that allows for mathematical transformations.

Four Ways to Determine Value

So valuation requires an object to be valued, a framework for the valuation, and a criterion that reflects the usefulness or desirability of the object. Now we have several options.

- We can define the criterion of value in monetary terms, in which case the method to determine value is a *financial valuation* method.
- Or we can use a nonmonetary criterion and translate it into observable phenomena, in which case the method is a *value measurement* method.
- If the criterion cannot be translated into observable phenomena but instead depends on personal judgment by the evaluator, then the method is a *value assessment* method.
- If the framework does not include a criterion for value but does involve a metrical scale that relates to an observable phenomenon, then the method is a *measurement method*.

So, a measurement method is not a method for valuation, yet this type of method is often used within the intellectual capital community. Swanborn (1981) defines measurement as the process of assigning scaled numbers to items in such a way that the relationships that exist in reality between the possible states of a variable are reflected in the relationships between the numbers on the scale. Measurement methods do not use value scales, but use measurement scales instead.

Figure 1 shows the relationship between financial valuation, value measurement, value assessment, and measurement. The decisive factors are the use of values as criteria, the use of money as the denominator of value, and the observability of the criteria or measured variable.

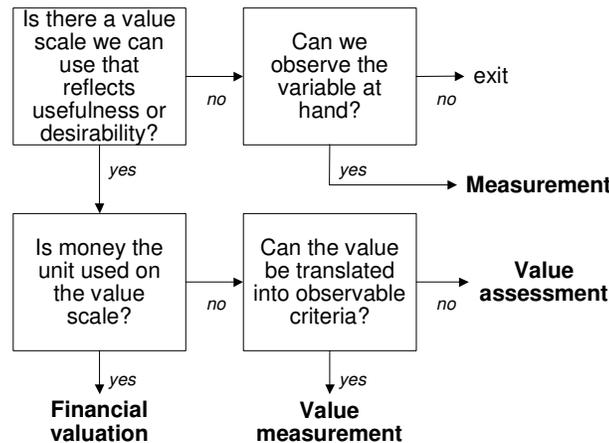


Figure 1: Four ways to determine value

The subjective nature of valuation

Value is defined as *the degree of usefulness or desirability of something, especially in comparison with other things*. However, what is useful to someone does not have to be equally useful to somebody else. In that respect, “value is in the eye of the beholder.” Furthermore, what is useful in one context does not have to be useful in another context. So value is, by its very definition, subjective.

The subjective nature of value is reflected in the need with any valuation to define carefully the appropriate standard and premise of value. Any valuation requires first the selection of the appropriate *standard of value*. This standard provides an answer to the question: Value to whom? Reilly and Schweih's (1999) list ten different standards, including fair market value, market value, acquisition value, owner value, and insurable value. These are all different values for different parties: sellers, buyers, insurers etc. So one knowledge asset can have multiple values, depending on whose eyes we are using.

Then proper valuation requires selecting the appropriate *premise of value*. “The premise of value is the assumed set of intangible asset transactional circumstances under which the subject intangible asset will be analysed” (Reilly and Schweih's, 1999, pp.61–62). This reflects the fact that circumstances determine the usefulness of a knowledge asset. When a company is in a state of bankruptcy the value of its knowledge assets will be different from a state of going concern. Often the highest and best use for a knowledge asset is selected as the premise of value. This premise states that the use of the knowledge is legally permissible, physically possible, financial feasible, and aimed at maximum profitability.

Financial valuation

Financial valuation seems to be the most useful valuation method the purpose of determining the value of knowledge in the case of knowledge transfer. What are ways to determine the financial value of knowledge as a 'thing' and what are the puzzles to solve in doing a financial valuation?

Three valuation methods

In the literature on financial valuation methods (Lee, 1996; Reilly and Schweih, 1999; Smith and Parr, 1994), one can find three approaches to financial valuation:

1. Cost approach
2. Market approach
3. Income approach

The *cost approach* is based on the economic principles of substitution and price equilibrium. These principles assert that an investor will pay no more for an investment than the cost to obtain an investment of equal utility (Reilly and Schweih, 1999). Thus, the price of a new resource is commensurate with the economic value of the service that the resource can provide during its life.

The problem with the cost approach is that in many cases cost is not a good indication of value. Many of the most important factors that drive value are not reflected in this approach. These factors include (Smith and Parr, 1994):

- The amount of benefits associated with the resource
- The trend of the economic benefits (increasing or diminishing)
- The duration over which the economic benefits will be enjoyed
- The risks associated with receiving the expected economic benefits

Furthermore, all relevant forms of obsolescence of the subject resource have to be identified, quantified, and subtracted from the cost of the resource to estimate the value. The cost approach is appropriate to value intangible resources when setting transfer prices, royalty rates, or when estimating the amount of damages sustained by the resource owner in an infringement or other type of litigation.

The *market approach* is based on the economic principles of competition and equilibrium. These principles assert that in a free and unrestricted market, supply and demand factors will drive the price of any good to a point of equilibrium (Reilly and Schweih, 1999). In the market approach, an analysis is made of similar resources that have recently been sold or licensed. The market data are used to estimate a market value. The market approach can only be used if data are available on the transaction of intangible resources that are similar to the subject resources. When the subject resources are unique, which is often the case, this approach is not appropriate.

The *income approach* is based on the economic principle of anticipation. The value of intangible resources is the current value of the expected economic income generated by these resources. The income approach is often the best alternative compared with the cost and market approach, especially in the case of knowledge valorisation, but the approach requires a number of 'puzzles' to be solved by stipulating several assumptions.

Puzzles to solve in the income approach

When applying an income approach the following puzzles must be solved:

1. Income projection puzzle
2. Income funnel puzzle
3. Income allocation puzzle
4. Useful life estimation puzzle
5. Income capitalization puzzle

INCOME PROJECTION PUZZLE

The income approach is based on a projection of economic income and thereby on somehow predicting the future. Therefore, it always contains a level of uncertainty and subjectivity. "All income approach analyses are based on the premise that the analyst can project economic income with a reasonable degree of certainty. . . . The term reasonable degree of certainty is, by its very nature, subjective" (Reilly and Schweih, 1999, p.182).

INCOME FUNNEL PUZZLE

Knowledge 'things' generate not all the income produced by a business enterprise. Tangible resources and networking capital also contribute to the income generated. The problem is how to assign the overall enterprise income to the constituent components of the business enterprise, including all tangible and intangible resources. This requirement is referred to as

"a funnel of income adjustment because all of the income that is generated by a business enterprise can be analogized to the top (or wide) end of a funnel. For analytical purposes, we are only interested in that portion of the total enterprise income that gets down to the bottom (or narrow) end of the funnel—that is, that relates directly to the subject intangible asset. The adjustment is often necessarily in order to avoid double-counting or overestimating intangible asset values" (Reilly and Schweih, 1999, p.177).

This adjustment should include a fair return on the investment of all the resources used in the production of economic income, especially investments in tangible assets and networking capital.

INCOME ALLOCATION PUZZLE

The economic income that is left after the funnel of income adjustments can be attributed to all intangible resources of the business enterprise. The next problem is how to allocate this income among the various 'knowledge assets' including the one we want to transfer.

USEFUL LIFE ESTIMATION PUZZLE

Crucial in any income approach analysis is the estimation of the remaining useful life of the knowledge 'thing'. This is also referred to as the forecast period (Copeland et al., 1990), the projection period (Reilly and Schweih, 1999) or the cash flow duration (Smith and Parr, 1994). There are at least eight different ways to look at the remaining useful life of knowledge:

- "1. Economic life, depending on the ability to provide a fair rate of return
2. Functional life, depending on the ability to continue to perform
3. Technological life, depending on changes in technology

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4. Legal or statutory life
 5. Contractual life
 6. Judicial life, as a result of a court rule
 7. Physical life
 8. Analytical life, as a result of an analysis of similar intangible resources” (Reilly and Schweih, 1999, p. 241)

INCOME CAPITALIZATION PUZZLE

To come to a current value of future income, the economic income generated by the subject knowledge asset is divided by an appropriate rate of return. This discount rate reflects

- The expected growth rate of the income stream generated by the subject knowledge asset
- The cost of capital appropriate for an investment in the subject knowledge asset
- A compensation for inflation
- The degree of risk associated with an investment in the knowledge asset

Option theory

According to options theory, the problem with the income approach is that it assumes that the investment decision cannot be deferred. The possibility of deferral creates two additional sources of value (Luerman, 1998a):

1. If we can pay later, we can earn the time value of money on the deferred expenditure.
2. While waiting, the world can change and the value of the investment may go up (or down).

Furthermore, the decision to make an irreversible investment means we cannot put this money into other possible investments. Options are lost, which is an opportunity cost that must be included as part of the cost of the investment. In addition, the value of creating other options should be taken into consideration. An investment may look uneconomical but may create other options in the future that are valuable. To incorporate these sources of value in the decision-making process, options theory draws from the research that has been done on the valuation of financial options. Options theory adds an additional metric to the current net value matrix, which Luerman (1998b) calls the volatility metric. This includes the uncertainty of the future value of the assets in question and how long a decision can be deferred. If we then allow investment options to influence other future options, we can use “nests” of options upon options to depict investment strategies and to calculate the value.

Conclusion

It is clear why some people refer to valuation as an art. There are many hurdles to take, and even then the end result will still by definition be subjective. Because value is in the eye of the beholder a knowledge asset that is transferred in the process of knowledge valorisation will have a different value to different parties. In order to estimate the value of the subject knowledge asset one needs to know the exact circumstances of the party from whose eyes the valuation takes place.

Furthermore, when performing a financial valuation using an income approach, one needs to be able to predict the future. In the case of knowledge valorisation this future is often extremely uncertain because in most cases the knowledge that is transferred is still in its development phase. Equally difficult is the task to allocate the predicted income stream to

the various contributing components, of which the knowledge asset being transferred is only one. To bring the knowledge to the market one often needs a range of complementary assets (Teece, 2000) that all have right to a fair share of the income stream. This allocation puzzle is often neglected or minimized. On top of that difficult decisions need to be taken about the estimated useful life of the knowledge and the associated risk.

Option theory is often presented as a radical new approach to replace traditional discounted cash flow analysis. It includes the possibility of deferral into the equation and requires an additional set of assumptions about the uncertainty of the future and the value of the various options. The resulting formulas can be intimidating to non-experts with the danger of disguising the inherent subjective and speculative nature of any valuation of knowledge as a 'thing'.

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