Valuing intellectual capital of innovative start-ups

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1 author:

Aleksandra Grajkowska

Polish Institute for Research and Development, Warsaw

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Valuing intellectual capital of innovative start-ups

Aleksandra Grajkowska
Aleksandria Ventures Limited, Nicosia, Cyprus

Abstract

Purpose – The main purpose of this study is to contribute to the theory of intellectual capital (IC) with the new IC valuation method based on the economic value added (EVA®) concept as well as to present the Innovation Funnel, which is a useful management method and tool from which companies would benefit.

Design/methodology/approach – The paper first explains the links and differences between IC and intellectual assets (IAs) and aims at improving the reader's understanding of the share of the two classes of shareholders, monetary capital investors and intellectual capital investors, of the innovative start-ups. The paper provides practical guidance for use in IC valuation and financial management of innovation rather than a theoretical framework, and is based on the literature on innovation, IC, corporate finance as well as the practical experience of a few early stage venture capitals with whom the author cooperates.

Findings – The findings show a way of calculating fair share of an innovative company's shareholdings. The method reflects the risk adjusted future value of cash invested by monetary capital investors and a real market value of IC contributed by the founders. The paper also presents a method of financial management of innovation projects.

Research limitations/implications – The presented methods focus on creating shareholder value and on financial aspects of IC rather than on IC indicators and their graphical representation, hence, members of the IC community who seek more practical concepts may be more interested in the paper.

Originality/value – The paper proposes a practical perspective on the method for IC valuation, innovation projects' financial management, as well as fair division of a start-up shares between intellectual and monetary capital investors that would be useful for venture capital officers, innovative companies founders and R&D centers' managers.

Keywords Innovation, Intellectual capital, Assets management, Asset valuation, Risk management, Business formation

Paper type Conceptual paper

1. Valuation of intellectual capital – the "mirror" concept

In literature on intellectual capital (IC) it is very common that the terms: "intellectual capital" and "intellectual assets" (IAs) are used interchangeably, which is both confusing and incorrect (Andriessen, 2004). It is therefore very important to precisely define the aforementioned terms to improve communication and mutual understanding between the IC community and the world of corporate finance and accounting.

To be consistent with financial accounting terminology the two terms: assets and capital should not be misused even when related to IC. IAs, as any other company's assets, have to generate cash flows today or in the future (Berle and Means, 1991; Manton, 2006). On the other hand, IC is the human potential that could be converted into IAs (Bounfour and Edvinsson, 2005). As such, the value of assets reflects (mirrors) the value of capital (see Figure 1). Therefore, the value of company's IC is equal to the value of all its IAs. That explains why investors are willing to invest into promising, knowledge-based companies and pay the price per share that exceeds its current book

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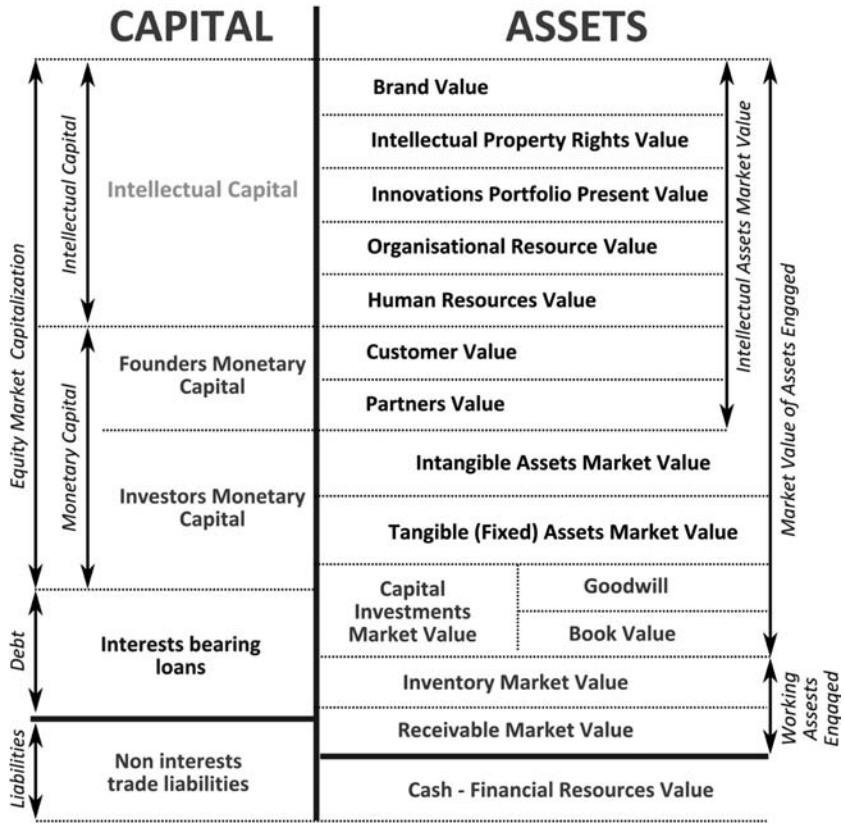


Figure 1.
The value of intellectual capital equals intellectual assets' intrinsic value

value, thus acknowledging the potential value of the company's intellectual capital (Damodaran, 1996) and creating "intellectual aggio".

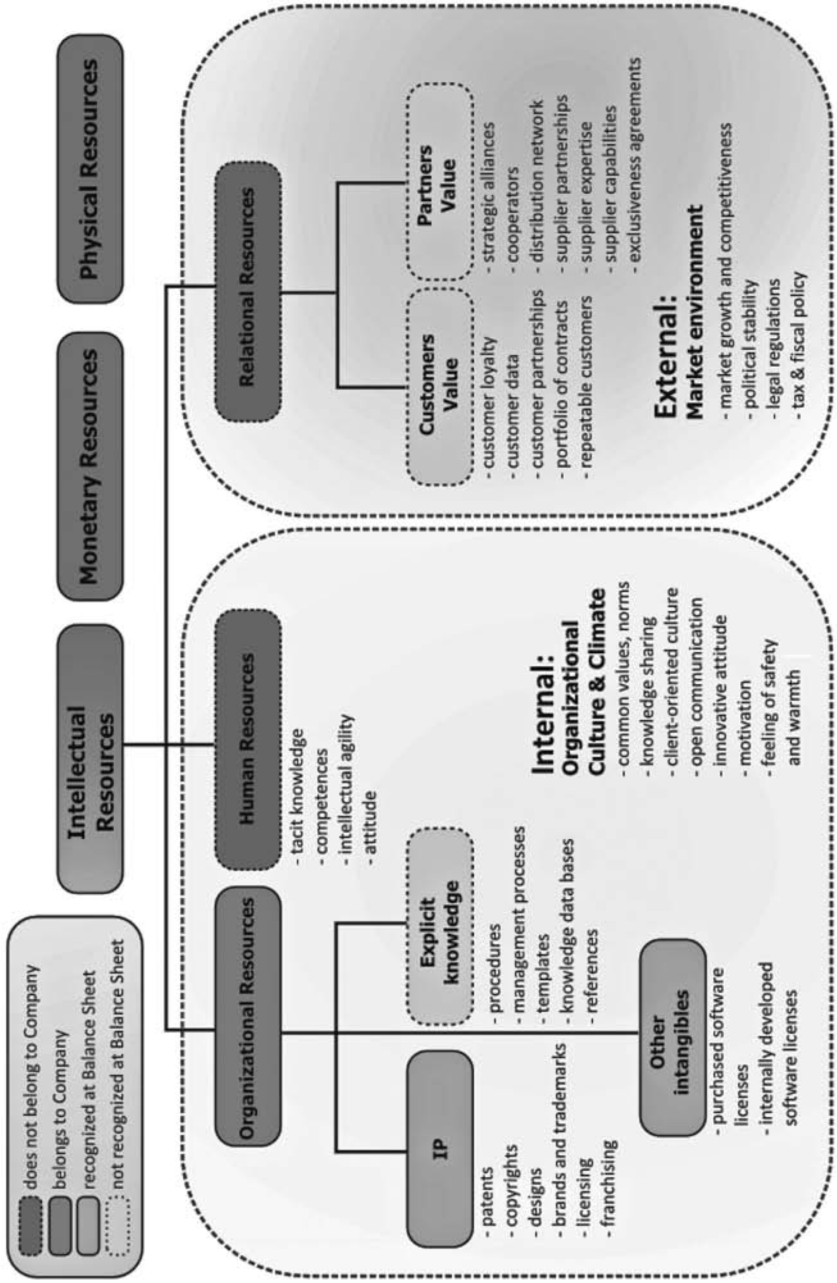
The value of the company's entire IC is mirrored by the economic profit created on all assets, especially IAs. The economic profit generated by each particular asset should be calculated separately as its estimated (intrinsic) or realized (market) value less cumulative value of cash invested into given asset from beginning to present day, capitalized with risk adjusted cost of capital rate (RaCoC). The level of RaCoC is determined by specific risks relevant for each asset, including IAs (see Table I).

The purpose of the valuation process is to define a fair market value of a company, which is not a trivial task in the case of innovative knowledge-based companies (KBC) (Daum, 2003). Fair market value is the price at which the asset (company) would change owner when neither the seller nor the buyer is under pressure to sell/buy, and both parties have equal knowledge about the asset (company) (Slee, 2004). Therefore, a critical element of KBC valuation is, through the process of business due diligence, to gather proper information about all its assets, especially the IA (Spedding and Rose, 2008). If IC seems to be the main value driver, it is recommended to perform intellectual capital due diligence aimed at in-depth identification and analysis of each intellectual asset's element (see Figure 2), intellectual property (IP) in particular.

Table I. Cost of capital calculation using build-up RaNPV formula

Company's annualized cost of capital build-up method	Year 1		Year 2		Year 3		Year 4		Year 5	
	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)
Risk free rate nominal value including inflation	3.5	3.6	3.7	3.8	3.9	4.0	3.9	3.8	3.7	3.6
Adjusted equity risk premium	28.0	27.3	26.5	25.0	24.3	23.5	25.0	26.5	27.3	28.0
Company-specific risk premium	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Project phase risk premiums	40.0	30.0	22.0	15.0	9.0	4.0	0.0	0.0	0.0	0.0
Sum-up										
Cost of capital monetary investment capitalization rate	76.0	64.9	56.2	47.8	41.2	35.5	32.9	34.3	35.0	35.6
Semi-annual monetary investment capitalization rate	38.0	32.4	28.1	23.9	20.6	17.8	16.5	17.2	17.5	17.8

Note: All the numbers are for example purposes only



Source: Grajkowska (2008)

Figure 2.
Intellectual resources taxonomy

1.1 Valuation of IAs

The most commonly used IAs (resources) valuation methods (Andriessen, 2005) have been presented below, with the first two not being recommended as they do not take into consideration any of the future benefits that the asset could bring to the company, but rather are influenced by the past assets investments or a market sentiment.

1.1.1 Cost approach. This method states that the value of an intellectual asset is equal to the amount of money spent on its development or expenditures that would be necessary to recreate it. The method's basic assumption is that no party will pay more for the asset than the reasonable cost of development of the given asset in-house. Nevertheless, using this method could lead to investment losses for the buyer when future cash flows from a given asset would not cover its purchase cost (Schmeisser *et al.*, 2010; Anson *et al.*, 2005). From the seller's point of view, the disadvantage of using this method is that the direct cost of an individual project (asset) does not include the risk premium incurred by the innovation center in respect to entire projects portfolio success probability (von Hippel, 1988).

1.1.2 Market approach. Market approach valuation method shows how much somebody would pay for a given IA or its functional equivalent. The market value of an IA could be estimated based on a comparison of past transactions when a similar IA was sold on the free market. The common problem with this method is proving that the transactions were similar enough. In most cases, transactions were done under different conditions, the assets are not directly comparable, have different characteristics, and will be used for different purposes by the buyer. Therefore it is rather difficult to use this method to measure the value of most IAs, which are unique by definition. Nevertheless, from a seller perspective, a market approach could provide a reasonable estimation of the market value of any asset, including IAs and IP (Mellen and Evans, 2010).

1.1.3 Income approach. In contrast to the cost approach, which is based on a calculation of avoided costs of development of similar asset in-house, the income approach quantifies the present value (PV) of future cash flows using discounted cash flow (DCF) formula (Reilly and Schweihs, 1998; Schmeisser *et al.*, 2010). Because IAs have a positive impact on revenue or cost reduction, they lead to increase in cash flows that could be generated as:

- *Direct income from sales or licensing of IAs*. The owner of IA could generate revenue from selling or licensing it to one or many customers (Anson *et al.*, 2005). The level of the royalty fees depends on the type of assets and should be set at a market price. The number of licenses to sell should be well planned and well argued in a marketing plan (Reilly and Schweihs, 1998). Finally, this approach requires forecasting revenue and profitability as well as investment in a given asset in order to provide the data to use at the DCF model. The accuracy of the method depends on accuracy of forecasted figures.
- *Indirect income (savings)*. This concept is based on the assumption that the company would generate lower income if it did not own a given IA, as it would lack competitive technology, innovative processes, or trade secrets (Rezaee, 2001).

- *Extra margins earned (brand premium).* The intellectual resources engaged in creating a company's brand converted into IA. That in turn could be valued by calculating the present value of excess earnings generated by product as a result of being traded under a name of desired brand (Grover and Vriens, 2006). The brand allows the company to generate higher income by selling more for the same price, selling the same amount, but at a higher price or to increase margins in comparison to similar, not branded products. All of the above generate cash inflow, which determines a brand value.

Summing up, for the purpose of the valuation of IA or innovative projects, the income approach is recommended.

2. Financing of innovation projects – RaCoC rate

A critical element of the risk adjusted net present value (RaNPV)as a specific form of DCF is a RaCoC, which reflects the time-value of the money as well as all the risk of each stage of the innovation project. The risk adjusted discount rate that should be applied in RaNPV calculation should be equal to RaCoC rate (Wilson and Shailer, 2004).

The virtual cost of capital (capital charge) has to be calculated using the discount rate when the innovation projects apply for funding. For simplification of the concept of a virtual cost of capital, a theoretical example of the cost of capital rates is presented in Table I. When the project is at the market entry phase (2H Year 3), after completing all preceding phases and when the market analysis confirms that the market entry has a chance to be successful, the project could get financing with an expected return rate of approximately 35.5 percent (an overall company risk level at 31.5 percent plus 4 percent risk free rate premium). In another case, when an innovator has only a prototype (1H Year 2), the venture capital would offer financing for the costs of capital above 56.2 percent, while, for the projects at early concept development stage (1H Year 2), the cost of capital would be even 76 percent (all values are used for exemplification purposes only).

The total cost of capital premiums included in RaCoC calculations is rooted from three areas: capital markets, company-specific risks, and innovation projects risks.

2.1 Capital markets driven equity risk premiums

The capital markets area of risks reflects the level of the investors' aversion to invest in equity assets let alone the companies of shares characterizes lack of marketability (see Table II):

- The standard equity risk premium (ERP) on average, depending on previous years and data sources is estimated at about 6 percent (baseline ERP) (Pratt, 2009). Nevertheless, the given year ERP differs from bullish to crisis years and has to be adjusted by alpha coefficient (VBM Consulting, 2010) reflecting the current capital market sentiment status.
- Depending on the stock investors' profits or losses from the preceding couple of months, the alpha varies from −100 percent (peak of the bullish time) to +100 percent (low of the beer market) of basic ERP respectively.
- The willingness of capital markets to invest into more diverse sectors decreases along with the level of their riskiness. The extra premiums for that are well described in literature and known as Beta factor (Damodaran, 2001).

Table II. Adjusted equity risk premiums

Company's annualized cost of capital build-up method	Year 1 1H (%)	Year 1 2H (%)	Year 2 1H (%)	Year 2 2H (%)	Year 3 1H (%)	Year 3 2H (%)	Year 4 1H (%)	Year 4 2H (%)	Year 5 1H (%)	Year 5 2H (%)
Risk free rate nominal value including inflation	*3.5*	*3.6*	*3.7*	*3.8*	*3.9*	*4.0*	*3.9*	*3.8*	*3.7*	*3.6*
Adjusted equity risk premium	*28.0*	*27.3*	*26.5*	*25.0*	*24.3*	*23.5*	*25.0*	*26.5*	*27.3*	*28.0*
Base (average over years) equity risk premium (ERP)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Equity risk extra premium/discount for capital markets current sentiment (alpha)	2.0	1.5	1.0	0.0	−0.5	−1.0	0.0	1.0	1.5	2.0
Risk premium for sector (beta)	4.0	3.8	3.5	3.0	2.8	2.5	3.0	3.5	3.8	4.0
Small cap premium	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Illiquidity discount premium for privately-held companies (gamma)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Note: All the numbers are for example purposes only

- There is evidence that investing in portfolios of small caps are treated by investors as more risky than large capitalization companies, leading to the necessity of including those premiums into RaCoC as well (Ibbotson Associates, 2009).
- If the investors had an opportunity to choose between investing into very comparable companies but one of them would be publicly traded and the other privately held, the former would be their first choice. In order to make themselves more desirable investors, privately-held companies have to offer additional premiums to overcome the investors' fears due to lack of marketability (Mercer, 2004).

2.2 Company-specific driven ERPs

The company-specific area of risks reflects the probability of cash streams being available for shareholders – free cash flow to equity (see Table III):

- As the cash flow generation by a given project or company originated at its revenue, the status of the order book, backlog and overall pipeline of sales leads currently being processed by sales and marketing department has material impact on how that specific risk is perceived by investors. Poorly proven forecast or at least a vision of future revenues translates into higher cost of capital premiums (Damodaran, 2009).
- The operating risk level, understood as the degree of change at operating result in relation to change at the revenue line, is determined by selected by the company cost structure between the fix and the variable part of costs. The less variable costs percentage-wise, the higher operating risk and bigger standard deviation of the company's operating results.
- Financing the company partially by debt could increase shareholders' wealth unless the return on net assets engaged by the company exceeds weighted average costs of total capital invested in it. Nevertheless financial leverage decreases shareholders' certainty of receiving cash flows as a part of them has to be distributed to the debt holders instead.
- The last, but not least, of the company's specific risks that have impact on the cost of capital are such business factors as high dependence on one key person, single client, technology or regulatory decisions.

2.3 Innovation projects-driven ERPs

An innovation project may fail at any of its development phases and, as the risks have a cumulative nature and multiply – therefore the earlier stage, the higher failure risk and consequently higher discount rate should be applied (see Figure 3 and Table IV).

An analysis of accumulated historical data at the Innovation Funnel database provides managers, independently for every stage, with key performance indicators (KPI), that define the average percentage of projects that managed to move to the next stage. This KPI describe the multiplied probability of write off respective to each phase and thus determine the risk rates to apply.

2.4 Statistical justification of early stage innovation high values risk premiums

The relatively perceived as high RaCoC of early stages of innovation development process is justified by typical statistics of failure probability (Damodaran, 2008).

Company's annualized cost of capital build-up method	Year 1		Year 2		Year 3		Year 4		Year 5	
	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)	1H (%)	2H (%)
Company specific risk premium	*4.5*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*
Revenue variability and backlog sales pipeline status	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Operating leverage risk premium	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Financial leverage risk premium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Technology, key person, single client, regulatory related risks	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Note: All the numbers are for example purposes only

Table III.
Company specific risk premiums

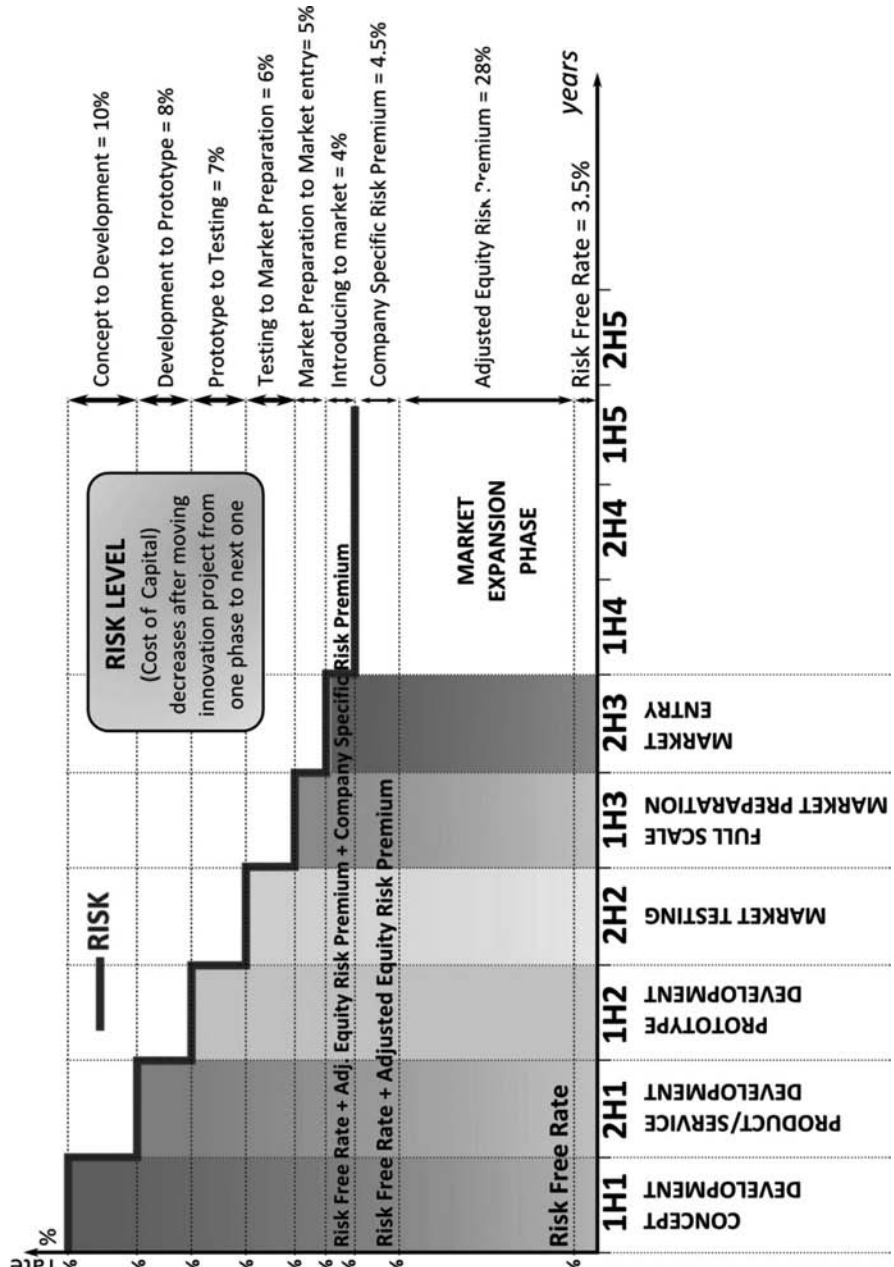


Figure 3.
Decreasing risk adjusted cost of capital as discount rate – example values

Table IV. Innovation projects risk premiums

Company's annualized cost of capital build-up method	Year 1 1H (%)	Year 1 2H (%)	Year 2 1H (%)	Year 2 2H (%)	Year 3 1H (%)	Year 3 2H (%)	Year 4 1H (%)	Year 4 2H (%)	Year 5 1H (%)	Year 5 2H (%)
Project phase risk premiums	*40.0*	*30.0*	*22.0*	*15.0*	*9.0*	*4.0*	*0.0*	*0.0*	*0.0*	*0.0*
Market entry	4.0	4.0	4.0	4.0	4.0	4.0				
Full-scale market preparation	5.0	5.0	5.0	5.0	5.0					
Market testing	6.0	6.0	6.0	6.0						
Prototype development	7.0	7.0	7.0							
Product/service development	8.0	8.0								
Concept development	10.0									

Note: All the numbers are for example purposes only

Table V presents theoretical portfolio of ten innovation projects financed at every stage with the amount of Euro 250,000 and assumption that at every stage one of the project is discontinued. In the end five out of initial ten projects reach the market introduction phase, but only two appeared to be big financial success (sold for eight times the money invested) and three returned cash invested only. Finally, overall portfolio returned to the financing party two times money with 20 percent of internal rate of return (IRR), which is a rather moderate investment performance. Nevertheless, to achieve these results the investment decision-making committee has to apply seemingly high expected returns to the RaNPV formula to end up with simulated returns on capital invested, otherwise after all write offs the output would be very unsatisfying.

Consequently, the risk of failure between the concept development phase and the market entry phase is very high, determining the high discount rate for calculating its respective RaNPV. Accordingly, when a given innovation project moves from the initial phase to the, e.g., prototype development phase, the risk of commercializing the product becomes much lower and therefore a lower discount rate should be used.

3. Introducing discipline in innovation projects financing

Although introducing to the market a catchy, improved or new product/service should bring company high profits, the reality is that a significant amount of money has to be spent at the beginning, and, out of all investments, just few appear to be commercially successful.

This explains why a clash of interests between innovators, representing IC, and financial investors, representing monetary capital, seems to be a common problem and widely recognized phenomenon. Is it truly unavoidable or is there an opportunity here for mutual understanding and fruitful cooperation? On the one hand, a typical innovation project is perceived as a black hole that is able to absorb an unlimited amount of cash, while the spending usually appears to be rational and necessary (English and Baker, 2006; Byrd and Lockwood Brown, 2003). On the other hand, financial investors are seen as greedy capitalists who do not understand the beauty of conceiving brilliant ideas and have no passion for science (Baker and Smith, 1998). In reality, close cooperation is to both sides' benefit, as it vastly increases the likelihood of a successful introduction of an innovation to the market (Kelley and Littman, 2001). Although both parties are brought together by their mutual desire for commercial success, they differ in risk assessment, priorities and perception of funding and time sensitivity (Damodaran, 2008). The innovators do not see the risks because they are optimistic and they usually do not invest their own money (Van de Ven *et al.*, 2000). Conversely, venture capital investors have experienced huge losses and write offs, making them very wary of losing the money entrusted to them (Gladstone and Gladstone, 2004).

Having taken the above into account, even though the innovator's dream is to have been given an unlimited budget or unlimited time to finish his work, the fact is that he must act quickly and stick to a given timeframe, budget, and project scope (Smith and Merritt, 2002). However, expecting him to count the cost of capital seems to be too much. The cost of shareholders' capital (equity) is recognized neither in the company's books, nor by project managers, because, contrary to the capital borrowed from banks, no interests have to be paid, and thus it is often believed to be costless. Nevertheless,

Table V. The example of investments and simulated returns on theoretical innovation portfolio

Start-up phase	Year 1 1H Concept development	Year 1 2H Product development	Year 2 1H Prototype development	Year 2 2H Market testing	Year 3 1H Market testing	Year 3 2H Market introduction	Year 4 Market expansion	Year 5 Total proceeds	Total investment	IRR (%)	Times × money
Annual RaCoC rate (%)	76.0	64.9	56.2	47.8	41.2	35.5	33.0	32.0			
Innovative project 1	−250	−250	−250	−250	−250	−250		12,000	−1,500	82.3	8.00
Cumulative investment		−500	−750	−1,000	−1,250	−1,500					
Capital change	−95	−193	−292	−378	−455	−517					
Cumulative capital change	−95	−288	−580	−957	−1,412	−1,929					
Cumulative capitalized investment	−345	−788	−1,330	−1,957	−2,662	−3,429	−4,560	−6,020			
Innovative project 2	−250	−250	−250	−250	−250	−250	−250	12,000	−1,500	82.3	8.00
Innovative project 3	−250	−250	−250	−250	−250	−250	−250	1,500	−1,500	0.00	1.00
Innovative project 4	−250	−250	−250	−250	−250	−250	−250	1,500	−1,500	0.00	1.00
Innovative project 5	−250	−250	−250	−250	−250	−250	−250	1,500	−1,500	0.00	1.00
Innovative project 6	−250	−250	−250	−250	−250			0	−1,250	Write off	0.00
Innovative project 7	−250	−250	−250	−250				0	−1,000	Write off	0.00
Innovative project 8	−250	−250	−250					0	−750	Write off	0.00
Innovative project 9	−250	−250						0	−500	Write off	0.00
Innovative project 10	−250							0	−250	Write off	0.00
Total investments	−2,500	−2,250	−2,000	−1,750	−1,500	−1,250	−1,000	22,480	−11,250	19.8	2.00

equity funding should be treated the same manner as bearing interest funds, such as money borrowed from bank or bonds. Debt and equity funds do not differ from the engaging capital investors' point of view, thus equity should be at least virtually charged (capital charge) for a cost of capital used to develop an innovation project. In order to attract investors to fund early stage companies or innovation projects, for the higher risk they take, higher returns should be promised. Otherwise they would be better off keeping their life's savings safe in the bank or investing in less risky assets. Only exceptionally high expected gains make investing in an innovation start-ups or risky projects rewarding and reasonable.

3.1 Innovation Funnel method

Innovation is very risky because most of the innovation projects tend to fail. Even though innovation is necessary to keep the business going, it is essential to manage them methodologically to avoid potential cash losses. To ensure that innovation projects add value, they should be monitored by an Innovation Funnel system that significantly disciplines the entire process and its participants (Terwiesch and Ulrich, 2009). The main feature of the Innovation Funnel is to provide managers with objective criteria to be met as required for promotion of the innovation project from the current phase to the next stage (see Figure 4).

Reports from the Innovation Funnel management system should show KPI of the company (or funds) managing the portfolio of innovation projects. Important KPI useful for proper risks applications are:

- What is the average success factor rate of projects that have completed each stage separately?
- How much time they needed to be promoted from current to the next stage?
- What percentage of all projects entering the funnel reach the final stage?
- What percentage of the projects that reached the final stage appeared successful?
- Investment performance of successful projects like capital gain, economic profit generated, times × money, IRR.
- Investment performance of the entire project portfolio and selected sub-portfolios.

Based on this kind of information, the company's (R&D center or venture capital) management can improve its ability to forecast. For example, how many projects at concept development stage do they need to input to the funnel to get sufficient projects at the market entry stage that will generate enough money to compensate all write-offs and still deliver positive cash return on all investments? This tool also shows how much money the company spends on every stage of each project as well as total investment cash-outs and cash-ins to calculate its cumulative capitalized value. Some of those measurements can be used to benchmark the sector's innovation performance. The IT tool is valuable in collecting data about projects that failed and include reasons why (about mistakes, technologies, timing, scheduling, budgeting and so on) so that knowledge can be used as lessons learned and distributed to the managers as dos and don'ts recommendations (or at least retrospective documents to be the compulsory reading for each project manager).

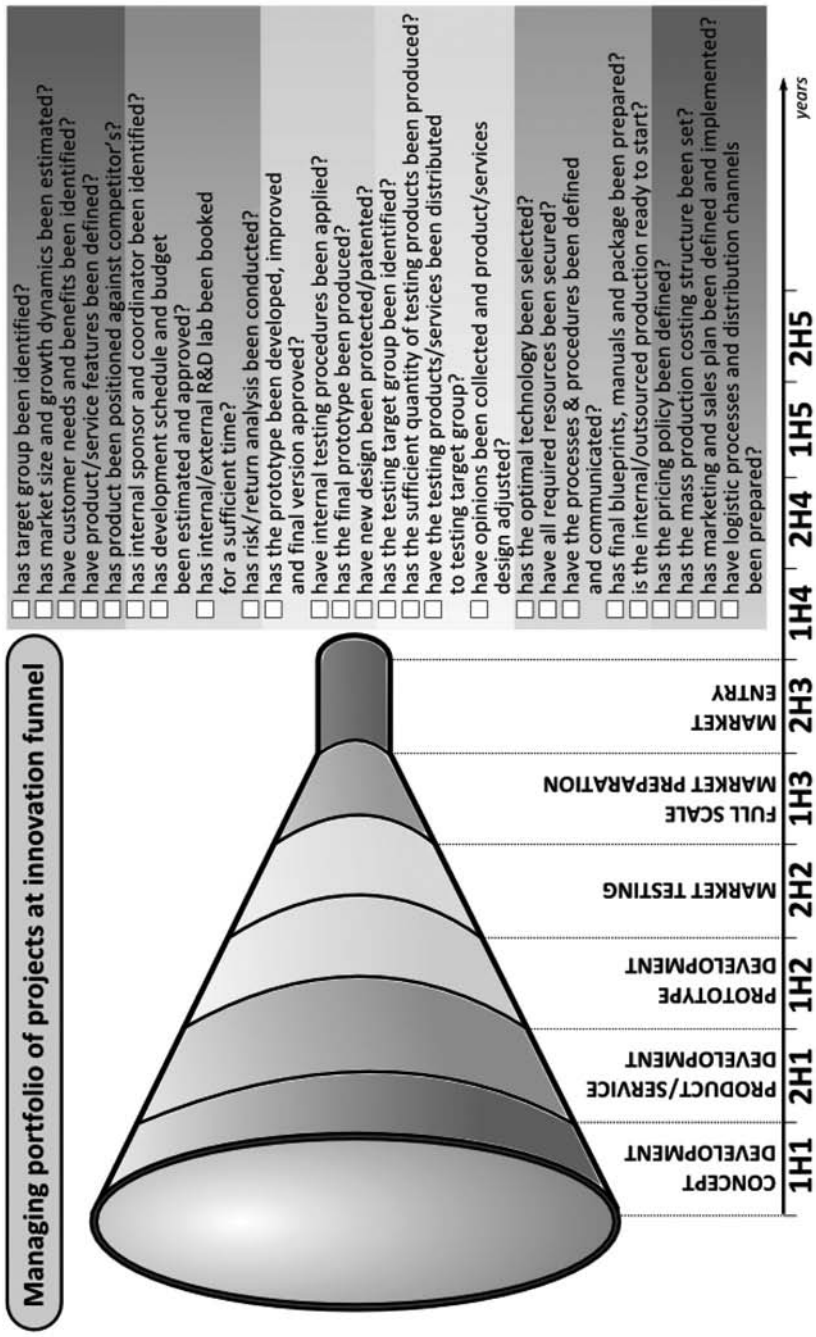


Figure 4.
The Innovation Funnel as a method and tool supporting operational and financial management of innovations

3.2 Innovation Funnel phases

Learning from expensive mistakes turns past losses into higher returns in the future, as the common mistakes could be avoided and better practices applied, so expectantly the hit rate will become higher. Splitting the innovative projects into phases will make the project manageable and provide the opportunity to monitor and control the budget, time, and task completion at every stage. Having objective criteria set and communicating to the project manager in terms of ordered tasks to be completed at any given phase of innovation development and required analysis and documentation to get promotion (and funding) to the next stage makes the entire process effective and transparent.

Transferring the cost of capital from the whole organization to the certain project that uses the capital at the moment is a recommended tool which pushes project sponsors and project managers to think and act in the favor of fast completion of the project. The tool motivates them to speed up the process of commercialization, pay back the cost of researching and developing new product or service and start earning above average returns for their company's shareholders.

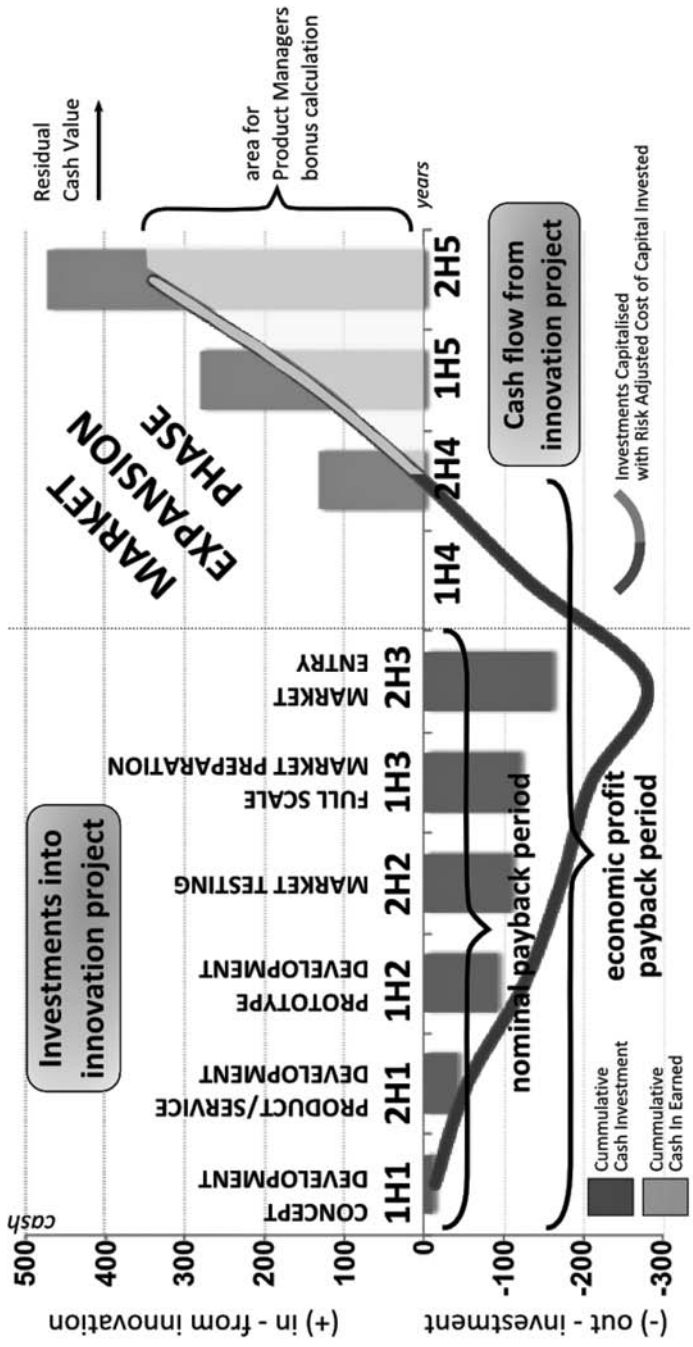
Managers who are aware that the capital charge they must pay back is getting lower as soon as they finish one stage and move to the next, less risky one, think more economically. They will also carefully plan and think over how much financing they can afford and how fast they should pay it back in order to get the best deal for themselves. Summing up, innovators or scientists will start to think like businessmen.

Consequently it would be reasonable to link the company management bonuses, beginning from project managers, with the profit their innovation projects make after paying back the cash invested in and increased by a virtual cost of capital "borrowed" from company. This would assure that they act truly in the best interest of shareholders. A complimentary system of financial management for innovation projects and respective motivation system (compensation schemes) for innovation product managers called Economic Profit Share Scheme (EPSS) is summarized on Figure 5.

4. Valuing the IC of a start-up company

When the contributors of monetary capital (for example venture capital) start negotiations with the owners of IC (founders of a new start-up), the valuation of both types of capital arises as one of main negotiation issue (Metric, 2006). Because a radical innovation or a new technology is in most cases the base for a start-up company, it is often difficult to make a credible prediction about its future market value, allowing only assumptions to be made. Nevertheless, the percentage of shareholdings for monetary capital investors (money) and (what is left) founders (pre-money valuation) have to be agreed somehow. Typically, an investment agreement with venture capital includes a transfer of founder's shares to VC depending on the company future financial performance and/or cash exits.

A new IC valuation method presented in this paper could speed up and make the process of negotiations easier as well as make the deal less risky for both parties. The founders' share of the start-up depends on the value of intellectual capital that was contributed during investment period. The value of IC is defined as a difference between realized market cash value of all start-up's IA and total cumulative cash investment capitalized with RaCoC rate (venture capital's expected investment value



Note: The figure shows that economic profit should be a base for innovation value calculations

Figure 5.
Cash-to-cash capitalized with RaCoC rate

(EIV). If the market value of VC shares (calculated investment value (CIV (calculated by formula or preferably proven by cash exit or initial public offering (IPO) valuation)) exceeds EIV value that would mean that IC was contributed by founders during the investment period.

As all previously unknown values became precisely defined, the only issue to be solved at the investment agreement is how both parties will share the economic profit created. Even though monetary and IC investors desire for participation in value growth, nevertheless, due to the fact that economic profit was generated mainly by IC, it is the founders that should get its larger percentage.

The cash provided by monetary investors is at the virtual cost of capital (RaCoC) thus the capital invested increases incrementally by capital charges. That motivates founders to spend cash very carefully as every dollar burned today directly decreases their percentage of reward in the future. When the start-up stage is completed, and the developed product achieves commercial success, the next stage of a mature company begins and both parties have an option to adjust its shareholding percentage at the company by respective CALL rights. During the latter, mature stage, when the innovative product generates profits that in turn allows to apply the formulas calculating monetary investors stake value (CIV), the shareholders could check each year if that value is higher or lower than capitalized value of net cash invested into it (EIV). If the founders generate economic profit they could be entitled to get the defined percentage of the company (CALL option from monetary shareholders) or simply get its equivalent in cash on exit (see Figure 6). At the downside scenario, when business is going not as good as forecasted at the day of the first investment, and, moreover, the VC stake at the company is valued even less than the cash invested, capitalized with minimal cost of capital set as hurdle rate (e.g. 7 percent annually,) then it does mean that the initial valuation was overweighed towards founders. In this case the IC investors are obligated to give the monetary capital investors the number of shares that makes their stake value equal to total cash invested capitalized with RaCoC rate.

The method proposed in this paper could be used for fair start-up's IC (pre-money) valuation. It takes into account the cash contributed by monetary investors and gives both partners the tool for proper post-money valuations. Finally, it clearly defines rules on how to divide the economic value added created due to the symbiotic cooperation between two types of shareholders at the moment of exit.

5. Conclusions and recommendation

First, this paper clarifies the meaning of IC and IAs, defining what differs and connects both of them, with the ultimate goal of making the terms acceptable for finance and accounting professionals, who do not tolerate confusing assets with capital. To achieve this goal in this paper, the company's entire capital has been divided into two main parts: monetary capital, which is simply cash introduced into the company by all shareholders, and intellectual capital, which is the intrinsic potential embedded within the IA capable of delivering returns that exceed RaCoC. The value of intellectual capital reflected by the IA, the main knowledge-based company resources, including intellectual property, is estimated in the classic way with RaNPV. The investors who believe more strongly in the company's success apply lower risk factors to their valuation models or use higher forecasted cash flows. This results in higher price they

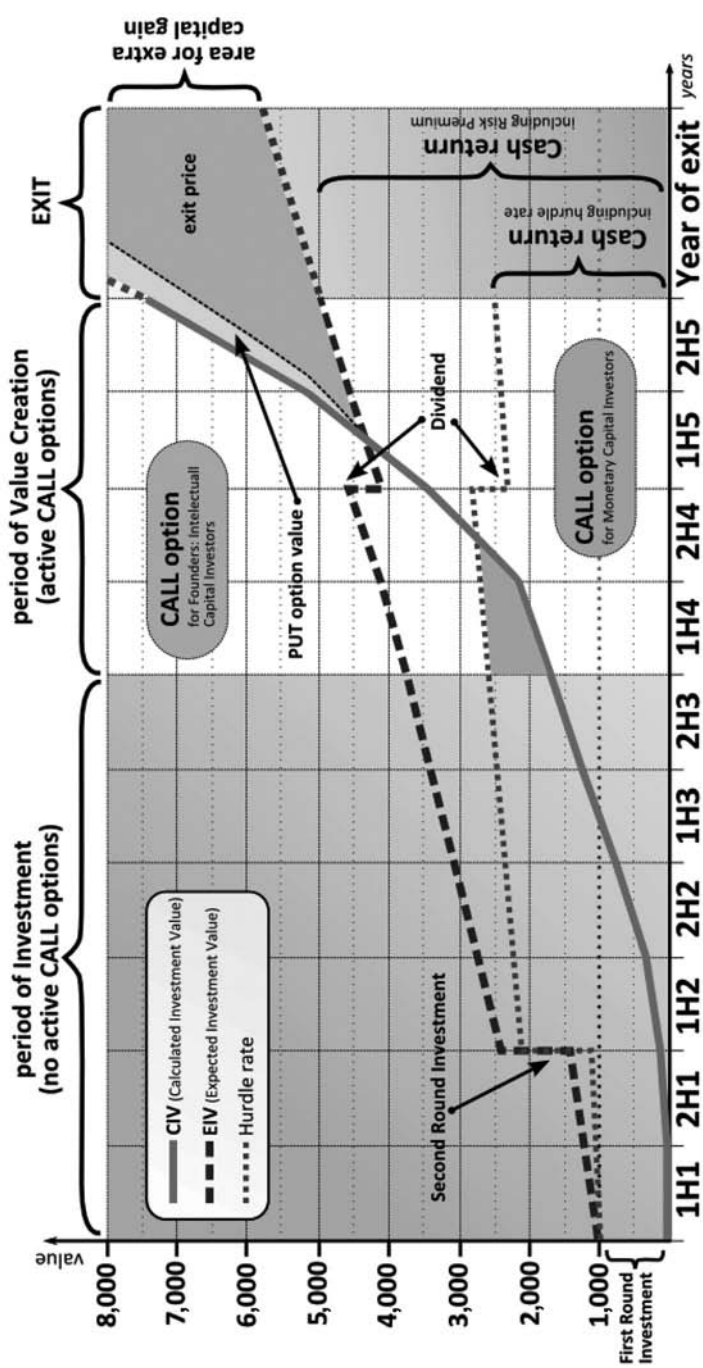


Figure 6.
The *ex ante* method of valuation of the intellectual capital component contributed by founders of a start-up company

are willing to a accept to purchase the company shares, leading to creation of "intellectual aggio". One of the key goals of this paper is to define the value of intellectual capital as the economic profit earned on monetary capital invested into company.

Second, this paper introduced the new concept of estimating risk adjusted cost of capital that is a key factor to calculating the present or future value of an investment. In contrast to the commonly used capital asset pricing model (CAPM) formula, the build-up of all risks premiums method is recommended as easier to understand and implement by innovation start-ups management. Moreover, due to detailed breakdown of overall cost of capital into a set of single risks components it is possible to manage each of them separately. Having every risk monitored by the control system, the direct impact on shareholder's value by adding or eliminating any risk from business operations is immediately visible and accountable.

Third, to make the proposed methodology feasible and practical, the Innovation Funnel has been introduced as a method and a tool to consistently control all budget and implementation processes within the projects' portfolios. Its main goal is to clearly define the stages of developed innovations, and all expectations and tasks to be met and completed in order to make a rational decision about promoting a given project to the next phase.

Finally, to motivate key employees of the company to think and act as shareholders, the new motivation system for project managers has been introduced. The compensation system – Economic Profit Share Scheme – is calculated based on the value created for shareholders.

The method of ex ante valuation of IC presented in this paper allows both parties to combine their resources: intellectual and financial, with a goal to do good business together, instead of focusing too much on pre money valuation negotiations at the beginning of cooperation.

The concluding remark is to invite readers to discuss the following issues raised by this paper in future research:

- Should valuing the IC as an economic profit generated on the company assets, the IAs in particular, be done with risk adjusted cost of capital, or with the minimal cost of capital of around 5-7 percent as hurdle rate?
- How to value each element of IA such as IP, organizational resource assets or partners value, with the method proposed.
- How to compromise in the situation when a hypothetical investor underpaid for the company shares and is not keen to transfer at exit time some shareholding to the founders, which in turn wish to exercise their call right for more shares as they generated high economic profit on the cash invested directly into the company.
- The challenging subject of further research is to precisely define profiles and values of each risk component of cost of capital to reflect the reality of capital markets' world expectations.

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About the author

Aleksandra Grajkowska holds a position as a Member of the Board of Directors at Aleksandria Ventures Limited. She also works as a Technology Investment Coordinator at Wroclaw Research Center EIT + and cooperates with Giza Polish Ventures. Her previous experience was in the knowledge management sector. She completed her Bachelor degree in business and management at Oxford Brookes University, UK. Her current research interests include innovation management, venture capital investments, intellectual capital and knowledge management. She is a member of the Society of Practical Knowledge Management. Aleksandra Grajkowska can be contacted at: aleksandra@grajkowska.net