

Interdisciplinary measuring the life cycle phases of ICT firms

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Abstract

Purpose – This study aims to check whether the conclusions of measuring the firm life cycle by a model related to economics and finance (Dickinson model) are consistent with the model related to management (Greiner model).

Design/methodology/approach – We applied the technique of individual in-depth interviews to verify firm development stages in the case of the Greiner model (nonfinancial aspect). We implemented cash flow statements prepared by using the indirect method to identify stages of a company's life cycle in the Dickinson model.

Findings – Dickinson's model (2011) unanimously indicates a specific development stage for the companies studied. In contrast, it was impossible to assign companies to a strictly defined development stage using Greiner's model (1972). However, the analysis of the results obtained with this model made it possible to distinguish development stages for different management areas in companies. These stages differ from each other.

Originality/value – The results of this research bring new knowledge to the analysis of the firm life cycle. It remains a relevant topic today. Many articles use models generally associated with one particular discipline (for instance, management or finance). This article proposes an interdisciplinary and area-based approach to company life analysis. To the best of our knowledge, no scholars have conducted such a study before.

Keywords Firm life cycle, Dickinson model, Greiner model, Cash flow, Individual in-depth interview, ICT

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Introduction

Similarly to humans, companies undergo development stages that involve changes in organizational structure, management style, and financing (Chandler, 1962; Greiner, 1972; Dickinson, 2011). Understanding these stages is key to holistic management (Gaibraith, 1982; Hanks, Watson, Jansen, & Chandler, 1994). The theory of the organization's life cycle describes these changes. The development of the concept dates back to the 1950s (Chandler, 1962; Hanks *et al.*, 1994). Over time, its assumptions have evolved, and the theory itself continues to serve in research related to dividends, financing, investment, and cash (e.g. Faff, Kwok, Podolski, & Wong, 2016; Chireka, 2020; Ahmed *et al.*, 2021; Cadenovic, Deloof, & Paeleman, 2023). Recent studies have also investigated revenue and cost shifts to overstate performance (Bansal, 2024) and the relationship between managerial sentiment and corporate investment (Rana, Sahu, & Debata, 2024). Despite numerous concepts, we have observed the first steps of implementing accounting variables into management data in the works of, e.g. Hanks *et al.* (1994) or Flamholtz (1995). However, these financial-accounting data used are limited and mainly concern sales revenues. Moreover, scholars developed the most frequently

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applied life cycle models in empirical studies when the world economy displayed entirely different priorities than today (from industrial companies to high-technology and very dynamic companies). Accordingly, future research must measure life cycle phases in modern sectors such as information and communications technology (ICT), which would include both financial and non-financial variables in the analysis. Thus, this study tests theoretical life cycle models to identify the development stages of ICT companies. It focuses on the Dickinson (financial approach) and Greiner (non-financial approach) models, checking that the conclusions of the company's life cycle measurement are consistent.

The remainder of the article contains the following sections. The second section will present the theoretical framework of the studied issue. The third one will present the methodology used in the conducted study. The next section will address findings and discussion. The article will conclude with the sixth chapter, which presents the final conclusions, implications, and limitations of the study.

Theoretical background

An enterprise undergoes transformations due to its members' decisions influenced by the complex and changing environment encompassing competition and macroeconomic conditions (Adizes, 1979; Aragonese, 2024). The key to future success lies in understanding the company's past evolution and its impact on current results (Greiner, 1972). An organization's life cycle is a sequence of transformations over time, captured within development stages, where companies exhibit different characteristics and face various risks (Quim & Cameron, 1983; Phelps, Adams, & Bessant, 2007).

Penrose developed the view that the company depends on the resources availability and opportunities abundance (Kor, Mahoney, Siemsen, & Tan, 2016). Dickinson (2011) describes the firm life cycle as a set of "multiple overlapping but distinct product life cycles." Research to date has not pointed to a single universal model for an organization's life cycle. Thus far, scholars have proposed numerous distinct interpretations of companies' development that differ in the nomenclature and number of development stages, as well as in the measurement criteria used. For instance, we may point to the three-stage model by Lippitt and Schmidt (1967). It refers to three phases: birth, youth, and maturity. This concept discusses how managers deal with predictable organizational crises. These criteria formed the basis for determining the company's development stage. On the other hand, Miller and Friesen (1984) proposed a five-stage organizational life cycle consisting of the following phases: birth, growth, maturity, revival, and decline. They characterized these stages through the prism of the aspects related to strategy, situation (environment), structure, and decision-making style in firms. The key insight is that in the long term, companies do not follow a gradual transition through the development stages within the defined model. The author of one of the most significant models in the last decade was Dickinson (2011). She based her five-stages model (introduction, growth, mature, shake-out, decline) on cash flow analysis. Thus, we may see a certain diversity in naming and number of phases in company development.

Furthermore, the literature reveals the implementation of single-factor measures to determine the development stage, like unidimensional retained earnings/net assets (RE/TE) or retained earnings/total assets (RE/TA) (DeAngelo, DeAngelo, & Stulz, 2006). Some studies have examined a combination of variables such as age, assets/sales growth, capital expenditure, and dividend payout (e.g. Anthony & Ramesh, 1992; Faff *et al.*, 2016) to distinguish the life cycle phases. Despite various approaches, no valid models have combined financial and non-financial variables (according to our best knowledge, based on the literature review). Yan and Zhao (2010) emphasize that variable selection should align with literature in economics, management, and accounting. Thus, considering the aforementioned observations, it is essential to examine organizational development through a multidisciplinary perspective rather than limiting it to a single discipline. This led to the following research question, drawn from the literature:

RQ. Do the conclusions of the firm life cycle analysis based on the financial model coincide with the findings of the firm life cycle analysis according to the non-financial model?

We did not identify studies that measure the development stages of an organization using at least two models and compare the results obtained (based on a conducted systematic literature review). We chose the Dickinson model (financial) and the Greiner model (non-financial) because both are based on the five-stage life cycle concept. The selected models were developed relatively long ago, with Greiner’s model dating back to the mid-1970s and Dickinson’s model being introduced in 2011. Greiner (1972) introduced the concepts of evolution (periods of growth) and revolution (periods of substantial turmoil), with each evolutionary period leading to a revolution. Furthermore, scholars have not yet validated the Greiner model fully empirically, nor have financial indicators been included in it. The Dickinson model (2011) includes financial measures and uses cash flow analysis, identifying eight possible cash flow patterns corresponding to life cycle phases. Tables 1 and 2 show the details of both models.

Methodology

Data collection

We decided to choose the individual in-depth technique (IDI; Flick, 2010; Glinka & Czakon, 2021) and content analysis to test Greiner model. The in-depth interview (IDI) technique provides a trusting environment and facilitates an open exchange of information. Moreover, we need to bottom the knowledge in analyzing the research area. Thus, the IDI technique was appropriate. The interviews conducted were part of a pilot study, within a broader research project aimed at measuring the development stages of companies from the ICT sector. We intended to initially explore the issue in terms of how to measure the development stages of an organization from a management and financial-accounting perspective. We used the obtained information in the survey development for a wider research sample. The interviews conducted highlighted the difficulties and some specificity of management data, which we considered in the questionnaire created. However, this is part of another study we do not discuss in this article.

Table 1. Characteristics of individual phases in the Greiner model

Category	Phase 1 Creativity	Phase 2 Direction	Phase 3 Delegation	Phase 4 Coordination	Phase 5 Collaboration
Management focus	Make and Sell	Efficiency of operations	Expansion of Market	Consolidation of Organization	Problem Solving and Innovation
Organization structure	Informal	Centralized and Functional	Decentralized and Geographical	Line-staff and Product Groups	Matrix of Teams
Top management style	Individualistic and Entrepreneurial	Directive	Delegative	Watchdog	Participative
Control systems	Market results	Standards and Cost Centers	Report and Profits Centers	Plans and Investment Centers	Mutual Goal Setting
Management reward emphasis	Ownership	Salary and Merit Increases	Individual Bonus	Profit Sharing and Stock Options	Team Bonus

Source(s): Greiner (1972)

Table 2. Characteristics of company development stages according to the Dickinson model

	1	2	3	4	4	4	5	5
Predicted sign	Introduction	Growth	Mature	Shake-out	Shake-out	Shake-out	Decline	Decline
Cash flows from operating activities	-	+	+	-	+	+	-	-
Cash flows from investing activities	-	-	-	-	+	+	+	+
Cash flows from financing activities	+	+	-	-	+	-	+	-

Source(s): Dickinson (2011)

We created the interview script based on Greiner's 1972 article. We divided relevant descriptions concerning the phases of organizational development into specific areas of firm functioning and later reformulated them into relevant questions. Moreover, the scenario included additional questions related to the management of the organization and it did not directly derive from Greiner's descriptions. We included financial questions at the end of the scenario. We planned a total of 29 questions. We divided them according to the following areas: organization structure, top management style, management, control system, management and employee rewards, customers, employees, products, and financial issues. [Table 3](#) shows selected questions included in the questionnaire.

A single author conducted the interviews. The participants of the study were not previously acquainted with the researcher. We selected respondents from a meticulously prepared database. We created it by selecting companies from ICT clusters in Poland, using specific inclusion and exclusion criteria based on the Polish ICT industry development report up to 2025 ([PARP, 2017](#)). The criteria included active information and communications technology companies operating in Poland, excluding subsidiaries of foreign companies and those lacking balance sheets and profit and loss accounts for the period. Furthermore, we excluded companies that began operations in 2020 or later to include companies of varying ages and ensure access to financial statements, which organizations typically publish six months after the fiscal year ends. We were interested in reaching companies that have operated in the market for a relatively short time, as well as those that have been in business longer. The prepared base

Table 3. Selected questions from the IDI

Area studied	Questions
Management focus	Are the problems that arise in the company solved within specific teams or by specific individuals?
Organization structure	What is the organizational structure of the company?
Top management style	What are your responsibilities? What is the decision-making process in the company? Are key decisions made by a multi- or single-member team?
Control systems	Have specific standards been implemented in the company, described whether by job instructions or procedures, which define unambiguous ways of performing given activities (processes)?
Management reward emphasis	Is there a salary and/or non-salary incentive system in the company?

Source(s): Authors' compilation, based on [Greiner \(1972\)](#)

also met this criterion of diversity. Thus, we randomly selected respondents from such a prepared database. We conducted interviews with those who positively responded to the invitation by email and/or by phone. We informed managers about the study's purpose prior to the research. We instructed respondents to answer questions in the context of how the situation in the company was currently developing to the topics under investigation at the very beginning of each interview. We conducted in-depth interviews between December 2021 and March 2022 with eight in-house managers who, at that point in time, worked at companies belonging to ICT clusters in Poland. We rejected two questionnaires with responses due to data quality. Finally, we included six interviews in the study. The material collected provided comprehensive data that sufficiently allowed us to fulfill the study purpose. In effect, this made it possible to address whether the conclusions of the life cycle analysis according to one model and the other are consistent or divergent and whether the development stage can be unambiguously assigned to the analyzed companies based on the selected models. Thus, due to the study's nature, we achieved data saturation, which enabled us to meet and fulfill the study objectives (Saunders *et al.*, 2018).

Table 4 shows the characteristics of the selected companies. We conducted interviews via the Teams platform due to the COVID-19 pandemic, with interviews lasting between twenty minutes and an hour and a half. We digitally recorded all interviews. An outside company provided the transcription service. During the interviews, we took field notes to support the process of coding respondents' answers.

Furthermore, we used the Dickinson model. Therefore, we acquired financial data from the EMIS database and the ekrs.ms.gov.pl website to verify the phases of the company's life cycle. Most of the data did not include cash flow statements. Then, we calculated it independently using the indirect method. This aimed to maintain a uniform methodology, even if a company or two provided a cash flow statement prepared internally.

Assigning a company's development stage involved more than applying the Greiner and Dickinson models. We also asked the executives of the companies studied to determine what stage the company was currently in, referring to the data characterizing each stage in Greiner's model.

Data analysis

We already assigned the specified questions at the beginning to specific thematic categories such as organization structure, management style, governance, control system, management and employee rewards, customers, employees, products, and financial issues. It resulted from the nature of this study and the way we created the scenario. Meanwhile, specific areas of the company's operations were characterized by descriptions related to specific phases of

Table 4. Characteristics of the companies interviewed

Firm	Year of incorporation	Company activities
A	1995	Providing services for public administration, local government and enterprises (both public and private) in the field of broadly understood IT, ICT and physical security
B	2015	Activities in the field of intelligent systems using radio technology
C	2012	Software-related activities
D	2000	Implementation of tasks in the field of telecommunications services such as data transmission, digital telephony, Internet access
E	2015	Manufacture of soaps and detergents, cleaning and polishing agents
F	2019	Manufacturer of subscriber telephone exchanges and telecommunications servers

Source(s): Authors' compilation

organizational development, which came from Greiner's (1972) article. Thus, after collecting the data, we proceeded with the process of data reduction and analysis, which included four phases: "preparing the data, studying the transcript, structuring the results, and preparing the report" (Maison, 2010, as cited in Kaczmarczyk, 2011). Therefore, we began by reading the interview transcripts to determine the development stage of the companies according to Greiner's model. We annotated managers' statements related to certain questions within the mentioned areas with initial descriptive codes. We selected excerpts of statements that corresponded to the study's objective. In the next step, we reallocated specific questions and answers based on the codes originally assigned and the data included in the collected statements. Consequently, we reduced the analyzed areas to the following: organization structure, management style, management, control system, management, and employee rewards. Then, we made assignments of the answers given by respondents to specific development stages, having as a reference the characteristics of specific development stages according to Greiner. We used the financial information obtained from the interviews to create the questionnaire, but we did not include it in the data presentation contained within Tables 7 through 12.

We decided to select one company (company A) to present the conclusions. This firm did not stand out from the others analyzed. Therefore, we discussed in detail the answers given by a manager working in this company. We quoted fragments of respondents' statements and conclusions related to the study topic. We will present summaries for all studied companies in the Conclusions section.

Table 5 presents the sets of marks obtained under operating, financial, and investment activities, indicating the development stage of all companies. We used the information in this table to analyze financial results.

The discussion section presents conclusions that we reached by comparing the effects obtained using the Greiner model and the Dickinson model to analyze the companies' development stage. We juxtaposed it with the respondents' subjective assessment of their company's development stage. For this purpose, we used Table 6. We presented it to the managers at the very end of the interview. After reviewing the information in the table, respondents selected a development phase.

Findings

This study identified the development stage of the selected ICT companies. In the following, we will discuss the answers given by the manager of the one selected company within the specified areas (firm A). We will also provide a table summarizing all responses within each area. The more intense the color, the greater the number of responses indicating a particular phase of the company's development.

Table 5. Firm's phase of development according to the Dickinson model

Firm	Predicted sign Cash flows from operating activities	Cash flows from investing activities	Cash flows from financing activities	Phase of development
A	+	+	-	4
B	-	-	+	1
C	-	+	+	5
D	+	+	+	4
E	-	+	+	5
F	-	+	+	5

Source(s): Authors' compilation

Table 6. Characteristics of life cycle phases vs area

Category	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Management focus	<i>Make and Sell</i> Company founders focus on product development; they are engrossed in making and selling a new product	<i>Efficiency of operations</i> Key supervisors take most of the responsibility for setting direction	<i>Expansion of Market</i>	<i>Consolidation of Organization</i> There is a partial return to centralization	<i>Problem Solving and Innovation</i> Phase 5 of the evolution is based on a more flexible and behavioral approach to management
Organization structure	<i>Informal</i>	<i>Centralized and functional</i> The aim is to separate the activities; work assignments become more specialized	<i>Decentralized and Geographical</i> Formal and decision-making powers are delegated as far down the ladder of subordination as possible	<i>Line-staff and Product Groups</i> Units are grouped according to the product key	<i>Matrix of Teams</i> Organizational units are arranged in a matrix
Top management style	<i>Individualistic and Entrepreneurial</i> Founders reluctant to undertake management activities	<i>Directive</i> Definition of guidelines, recommendations for action	<i>Delegative</i> Managers of the various units operating in the company are given the freedom to make decisions	<i>Supervisory authority</i> Top managers feel they are losing control over the company's diverse activities, as a result of decentralization	<i>Participative</i> Employees take ownership of part of the company's management and have a say in decision-making
Control systems	<i>Market results</i> Control of activities comes from immediate feedback from the market	<i>Standards and Cost Centers</i>	<i>Report and Profits Centers</i>	<i>Plans and Investment Centers</i>	<i>Mutual goal setting</i> The company decides to set company goals as a team
Management reward emphasis	<i>Ownership</i> Long hours are rewarded with modest salaries and the promise of ownership benefits	<i>Salary and Merit Increases</i>	<i>Individual bonus</i>	<i>Profit Sharing and Stock Options</i>	<i>Team Bonus</i>

Source(s): Based on the Greiner model (1972)

Greiner's model

Management focus. The first question verified whether top managers were absorbed by producing and selling new products or whether they delegate such tasks in some way and undertake any management-related activities. In the case of the first option, this would mean that the company is at the first development stage in the area of "management focus." If the second option occurred, it would mean that the company had moved out of the first phase and

Table 7. Analysis of the life cycle phase of companies within the category “Management focus”

Category	Firm	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
		Creativity	Direction	Delegation	Coordination	Collaboration
Management Focus	A					
	B					
	C					
	D					
	E					
	F					

Note(s): The more intense the colour, the greater the number of responses indicating a particular phase of the company’s development

Source(s): Authors’ compilation

toward the next development stages. The manager of the company under review responded in this way:

My responsibilities are mainly, well, keeping an eye on that COO (Chief Operating Officer). My duties also include a big part of taking care of the company’s image, sometimes also implementation in some projects, because the company deals with cyber security issues, where I am an expert, so there are such topics that I also implement in projects, executive-wise. ... Of course, all that belongs to the CEO (Chief Executive Officer) of the company, i.e., financial issues and everything related.

The reviewed company started by providing its services in the vicinity of its location in Poland. Therefore, when an entity decides to expand sales of its products/services to new markets (“we were entering the African market”), the company has reached the third development as described in Greiner’s model. Nevertheless, can we refer to market expansion only in the context of phase three? Can it accompany the next development stages if the board decides to do this? This is one of the many questions that have arisen in connection with the use of the Greiner model in life cycle research to clarify the characteristics of a specific phase.

Moreover, an interesting issue is the top management’s attitude toward the managers reporting to them (lower-level managers). Top managers in firm A treat lower-level managers as autonomous individuals. This is because the company hires experienced people with already defined competences to direct projects. Such a situation indicated that the company was associated with phases three through five. We conducted the same analysis for the other companies. Table 7 summarizes the results.

Organization structure. People are one of the company’s most important resources. Formal and informal relationships, as well as the processes they create, are crucial to the success of the company’s adopted strategy. A firm’s organizational chart can influence the productivity and motivation of its employees and, in turn, improve the company’s efficiency. Scholars have assigned specific organizational structures to the different development stages. Informal structures refer to the first development phase. On the other hand, formalized structures are characteristic of phases two to five. Noting the specifics of these phases, the organization’s centralized and functional structure characterizes the second phase. A decentralized structure pertains to the third phase, while a structure supplemented by product groups is characteristic of the fourth development phase, according to Greiner (1972). The organization’s matrix structure indicates the fifth development stage.

We asked the respondent to describe how the company shapes the position’s structure. Respondent also pointed to the division of authority and responsibility within the company.

They also described the systematization of duties, relationships, or links between the different employees. The top manager of the analyzed company A described it this way:

There is a top management team that consists of my colleague and me, who is also the other shareholder of this company. In addition, there is a security officer who deals with the protection of confidential information. The employees report to the operations director and work in a matrix system. Each employee does not just do one thing but has their areas of competences and skills within which they perform different tasks, depending on the contract. It is the responsibility of the COO to assign the employee to specific business projects. Such a way of management resembles a matrix structure.

Based on the above response, we classified company A in the fifth development stage. In general, assigning an appropriate development stage was easier in the case of organizational structure than in the case of the other areas. The respondents from company A and the others were able to describe quite precisely how the relations between the management and the other subordinate employees are shaped, whether tasks are delegated, etc. Table 8 presents the findings.

Top management style. Founders were reluctant to engage with management in the first development stage within this area. Subsequent stages involved setting guidelines and recommendations for actions, delegating tasks, and using company coordination techniques. In contrast, organizations reach the last development phase when employees are involved in decision-making in the company. Management gives employees some control over their work. Therefore, we were interested in, for instance, how the company’s decision-making process looks in the context of key decisions: whether decisions are made by a plurality of people or by one person. The respondent indicated that one person in the analyzed company makes key decisions. The manager of company A referred to the day-to-day decisions regarding the execution of the tasks for which the company was established and the delegation of tasks in the following way:

The company is staffed partly by salaried employees and partly by contract employees, whom we hire for specific assignments. So, within the company, everyone has to do their tasks, and it is up to the operations director to coordinate this. In general, I sometimes discuss with the operations director when I come across some situations where I think something might be wrong. Or when there is a longer contract, I am interested in how that contract is implemented. But ... there is no such thing that I, as CEO, would get involved in a process already aimed at specific employees.

Communication between the CEO and other employees currently takes place mainly via the Teams platform. This contact mainly concerns project-related topics, but only those in which the CEO is more involved. The CEO tends to contact the COO in the context of discussing strategic, HR, and financial matters (as he is now mainly managing the day-to-day responsibilities of the company’s employees). The CEO does not require employees to come to

Table 8. Analysis of the life cycle phase of companies within the category “Organization structure”

Category	Firm	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
		Creativity	Direction	Delegation	Coordination	Collaboration
Organization structure	A					
	B					
	C					
	D					
	E					
	F					

Source(s): Authors’ compilation

the office when there is no need. This change came during the pandemic. Previously, everyone met at the company’s headquarters, working in an open space.

Moreover, top management is not currently concerned with defining standards, described by function manuals or procedures, concerning how employees perform tasks (processes). There are only clearly assigned areas of competence and responsibility in the company, as each employee has their competence and responsibility area. The analysis of this issue indicates that the company was in the first development phase. In contrast, questions related to the company’s decision-making process place the company in phases three through five. We analyzed the other companies in the same way. Table 9 shows the results.

Control systems. We focused here on aspects such as the impact of market performance on the company’s operations control or the separation of cost, reporting, and profit centers. We asked respondents whether the company responds immediately to customer needs, which would indicate that the driver behind operations control is immediate feedback from the market (and management acts as customers respond). However, does the company’s response to customer needs involve a longer, formalized process? Respondent in interview A indicated that:

It depends on the type of customer ... because we also participate in proceedings such as public procurement. On the other hand ... we take care of our brand, which means that we will not deceive the customer into providing a solution that we know simply cannot be done. ... Generally, we sometimes do contracts on the cheap, i.e., without a margin, covering our costs, because we think the client is worth it. But we do not do contracts below cost.

The discussed company operates in a market that offers information security management systems. The respondent indicated that this market is currently dominated by entities such as law firms, which are not really in a position to guarantee their clients an adequate information security management system for the prices they offer. Unfortunately, this influences the shape of conversations between potential clients and the analyzed company. Consequently, no more than one-fifth end up with a contract agreement.

The respondent indicated that the company identified cost centers in its budget, analyzing further issues raised within the company’s control system. Moreover, the interviewee also indicated that profit centers had been ring-fenced. On the other hand, in the context of investment plans and centers, we asked the respondents whether the products they offer are treated as investment centers, where the return on invested capital is an important criterion used in the allocation of funds. The top manager in firm A answered as follows:

Know-how ... is what is in people’s heads and ... is a resource that we protect we store. So, in general ... we organize work in such a way that we use IT to make the work of our employees into value for the company ... it is a resource that the company can use in subsequent contracts.

Table 9. Analysis of the life cycle phase of companies within the category “Top management style”

Category	Firm	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
		Creativity	Direction	Delegation	Coordination	Collaboration
Top management style	A					
	B					
	C					
	D					
	E					
	F					

Source(s): Authors’ compilation

As a result of this analysis, we can assign the company to the second, fourth, and fifth phases, which are associated with the highest number of responses. We analyzed the other companies in the same way. Table 10 presents the results.

Management reward emphasis. We also analyzed the approach to the evolution of employee reward systems in a company, from top management to operational employees. The first development stage was characterized by long working hours, rewarded with modest salaries and the promise of owner benefits. Subsequent phases included various salary increases, merit bonuses, individual bonuses, or profit sharing. Only the final, fifth phase was characterized by rewards aimed more at team performance than individual achievement. A respondent commented on the company’s approach to rewarding employees as follows:

There are rewards in the company, while there is nothing like statutory bonuses or other such things. So everyone has their own remuneration. On the other hand, if a contract goes well and a margin is achieved on the planned contract, usually, some of the money within that contract margin is dedicated to awards. The management then gives awards to the employees who participated in the contract.

Based on the above response, we classified company A in the fifth development stage. In general, assigning the appropriate stage to the companies analyzed in the case of rewards was easier to determine than for the other areas (as in the case of the organizational structure). Table 11 shows the analysis results for all companies.

Table 10. Analysis of the life cycle phase of companies within the category “Control systems”

Category	Firm	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
		Creativity	Direction	Delegation	Coordination	Collaboration
Control systems	A					
	B					
	C					
	D					
	E					
	F					

Source(s): Authors’ compilation

Table 11. Analysis of the life cycle phase of companies within the category “Management reward emphasis”

Category	Firm	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
		Creativity	Direction	Delegation	Coordination	Collaboration
Management reward emphasis	A					
	B					
	C					
	D					
	E					
	F					

Source(s): Authors’ compilation

Table 12. Greiner model vs Dickinson model for the company A

	Category	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Greiner model	Management focus					
	Organization structure					
	Top management style					
	Control systems					
	Management reward emphasis					
Dickinson model	cash flow analysis					
Firm development stage by respondent	subjective evaluation					

Source(s): Authors' compilation

Dickinson vs Greiner

The application of Dickinson's model (2011) allowed us to unanimously identify the specific development stage of the tested companies. This contrasts with the findings obtained using the Greiner model to assess the current development position of specific companies (Table 12).

Furthermore, we asked the respondents to determine the current stage of their company by referring to the data characterizing each stage in Greiner's model. Table 13 shows the results. First of all, the mentioned executives very often could not clearly assign a specific phase. In the end, they indicated a particular phase because they identified their company with more data describing certain phases within specific areas (Table 6). Furthermore, in four cases, the phases provided by management indicated lower development stages than those implied by the Dickinson model. However, we observed a difference in phases for all companies. For firms C and D there was a discrepancy of two phases in the assessment. For companies A, B, and E, it was one phase, while for company F, it was three phases. Considering also the year of the companies' incorporation, self-assessment based on the Greiner model may be more appropriate than the Dickinson model for most of the analyzed entities. The extreme case was company F founded in 2019. At the time of the interview, it had been operating in the market for three years. Given the short time since its founding, the self-assessment statement

Table 13. The current phase of the corporate life cycle: the Dickinson model vs management evaluation

Firm	Dickinson model	Management self-assessment (based on the Greiner model)	Variance in phases (number of phases) between the Dickinson model and self-assessment	Year of incorporation
A	4	5	1	1995
B	1	2	1	2015
C	5	3	2	2012
D	4	2	2	2000
E	5	4	1	2015
F	5	2	3	2019

Source(s): Authors' compilation

indicating phase 2 (growth) seemed to be more accurate than phase 5 (decline). Based on the analysis of the four cases, we concluded that the Dickinson model classifies the company in later phases than the assessment of the individual elements related to the management sphere.

Discussion

The study shed new light on the issue of measuring the life cycle phases of companies and provided several interesting conclusions, suggesting that research in this area requires further development. It is difficult to unambiguously identify the development stage of an organization, considering the conclusions from the measurement of the development stages of companies according to Greiner's model (1972). We conducted the assessments based on the Greiner model within the individual areas in which the company operated, which were mainly concerned with the entity's management style. The difficulty in clearly defining the stage of organizational development resulted from the fact that there are too many possible combinations of certain variables describing specific areas of firm operation as well as development stages that can occur at one time in companies. Consequently, assigning the company as a whole to only one development stage proved almost impossible. We observed that companies can be in different development stages in all analyzed areas of their operation, at one point in time. Thus, we believe that the model's main limitation is attempting to assign a company to only one development stage through the prism of its various fields of activity. However, it inspired us to take a new look at measuring the life cycle phases of companies ("area-based approach").

As mentioned, Greiner's (1972) model deals with managerial aspects. In contrast, the second model, Dickinson (2011), relates to financial aspects, i.e. cash flows. When researchers apply this model, they may obtain a clearly defined stage of the company's life cycle, based on an appropriate set of cash flow signs. When we juxtaposed the results obtained in the Dickinson framework with the results obtained from the Greiner implementation, we observed that it was common for companies at earlier development stages, according to Greiner, to be classified into phase five based on the following flow signs: negative from operating activities, positive from investing activities, and positive from financing activities. Companies at earlier development stages can also achieve the same flows, e.g. negative flows from operating activities are characteristic of the initial phase 1 and phase 5. It may be influenced, on the one hand, by the amount of the net loss and, on the other, by additional adjustments, the most important of which are amortization and depreciation, as well as the change in working capital. The study subject was ICT companies that may have had a low level of amortization due to a small stock of fixed assets. Thus, this adjustment may not have changed the sign of the flows to positive when incurring a loss in the initial development stage. Moreover, research and development expenditures (R&D) for software development may be booked as operating expenses, which significantly reduces the financial result in the company's initial as well as growth phase and may consequently lead to negative operating cash flows. On the other hand, a different effect in the area of flows would be the activation of R&D expenses in assets as intangible assets and amortization over time.

Thus, although the implementation of the Dickinson model allowed us to clearly assign a development phase to the entire company, we recognize some limitations of this method. The Dickinson model considers the sign of variable cash flows but does not consider the magnitude of cash flows. It also does not interpret the individual categories of the cash flow statement, which ultimately affect the value and sign of net cash flows from the three activities (Habib & Hasan, 2019). The Dickinson model may also oversimplify reality. Companies that are start-ups may generate a loss for several more years before they reach the appropriate scale of operations and break-even point, no longer being in the start-up phase but in the intensive growth phase. During this time, they may obtain funding from external investors (VCs, business angels), which allows them to survive while expecting to increase the company's value. Although such a company will be in the growth phase, operating cash flows may be

negative, which, depending on the pattern of other cash flows, will classify the company at stage 1 or stage 5. Thus, it raises the question of Dickinson model's universality. Possibly, the model is more suitable for traditional industries, e.g. manufacturing, and less so for high-technology companies due to the nature of their business. Perhaps the assessment of cash flows should be supplemented with an examination of the structure of flows from operating, investing, and financing activities, as well as other financial variables (e.g. revenue growth rates), including also the specification of functioning entities within specific sectors.

Conclusions

The study aimed to check whether the conclusions of measuring the firm life cycle by models related to two specific dimensions were consistent: economics and finance (Dickinson model) and management (Greiner model). We applied the technique of individual in-depth interviews to verify the phases of firm development in the case of the Greiner model (non-financial aspect). We also analyzed financial documents and cash flow statements to identify stages of a company's life cycle in the Dickinson model. The study indicated that there was a lack of convergence in the results obtained from the life cycle analysis of companies using financial and non-financial models. Moreover, the study revealed the difficulty in clearly defining the company's development stage according to the non-financial model.

The study has practical implications for practitioners, investors, policymakers, and scientists by demonstrating the limitations and inconsistencies between the Dickinson and Greiner models in assessing firm life cycles. For practitioners, the findings highlight the importance of using a more comprehensive approach that integrates both financial and non-financial variables to accurately determine a company's development stage. This involves selecting the appropriate financial metrics as well as identifying the company's current development stage within management areas and confronting these with risks and threats that may arise in the future. Incorporation of these activities can improve strategic planning, resource allocation, planning of financing for innovation projects, or risk management in a company's operations, depending on the development stage. In the case of investors, the study underscores the need for a nuanced evaluation of company growth stages, especially in dynamic sectors like ICT, where traditional models might oversimplify the financial realities and lead to misclassifications. An investor considering investing in such a company should understand that it can develop in unusual ways. In some areas, a firm may already be mature (e.g. strategic management). However, their age, or assessment based on the Dickinson model, may indicate a different stage (e.g. earlier). This deeper understanding can enhance investment decisions by providing a clearer picture of a company's growth potential and associated risks, as well as conducting a valuation of the company or its assets. Policymakers can leverage these findings to design more effective support mechanisms that consider both financial health and management practices, promoting sustainable business growth.

The research underscores the need for future studies to develop a model incorporating both financial and non-financial variables to measure company development stages more accurately, addressing the lack of synchronization found between current models. Especially, we point to the legitimate need for further research in (1) creating a model that involves financial and non-financial variables for measuring the companies development, as we have seen a lack of synchronization of results between financial and non-financial models for measuring the organizations' development. (2) Moreover, there is a gap in models strictly dedicated to companies belonging to high-tech sectors (like ICT), which develop with a different intensity and dynamics than those of standard sectors. We believe that it is necessary to measure the growth of companies from a sectoral perspective. (3) We also suggest expanding research to analyze specific areas of company development within a sector rather than assigning a company to a single development stage. Scholars could characterize each area by variables and classify it into different development stages. This approach would highlight areas for improvement and help managers understand how each department is developing

(whether at the same pace, faster, or slower – “area-based approach”). Future research can contribute to more efficient resource allocation by providing insights into the situation in individual company areas, which is crucial due to limited human and financial resources.

The presented study also has some limitations. The empirical material is based on a few interviews with top management of companies. Further research is needed, which should also include data collection among lower-level employees. Moreover, the selected concepts of the organization’s life cycle involve some limited set of variables. Therefore, it is important to continue the research with a broader selection of variables, describing the situation in the company and its relationship with the environment. Therefore, we find it necessary to identify the areas in which the company is moving in its life cycle and then determine the variables that characterize changes within these defined areas. Nevertheless, despite the indicated limitations, the study brings important knowledge to the subject of measuring the stages of the company’s life cycle.

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