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**Examination of Corporate Embedding at Local Level
on the Example of Three Hungarian Cities**

Theses of Doctoral (PhD) Dissertation

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BACKGROUND AND OBJECTIVES

'I consider the first task the elaboration of the concept of a new paradigm. The regional development routine of the last decades – also followed by the young generation – does not adequately address the recent reformulation of globalized economy. The former never-failing – or at least applied - examination methods are not only unproductive because of an inappropriate application, but because we do not aim to influence the typical territorial-social processes of our life. Thus, I conceive that the main task of basic research is to delineate the new model(s) of the spatiality of economy.'

(Enyedi, 2010, 400)

My primary objective in the dissertation is to examine and model corporate embeddedness as a local level phenomenon of the spatiality of the economy. Thereby we can explore the role and contribution of large companies in sustainable local economic development and city success and identify and predict the tendencies and potential problems in the future, together with suitable policy interventions to handle them. Three aspects justify **the selection of the topic** as follows: firstly, the global and national level relevance and timeliness of the issue; secondly despite the hot international debate on corporate embeddedness, the topic has received little research attention so far; and thirdly my own professional experience.

The innovative character of my research is threefold, with: a corporate-based approach towards previous focus on local government and higher education; a qualitative, process-based methodology aiming to examine system-level connections and qualitative changes; and the development of new process- and status-models to adopt international innovation models in real-time local environments.

Timeliness and relevance of the research are justified by global tendencies with the decreasing role of national states and economies occurring in parallel with the increased importance of sub- and supranational (regional, local, European Union) levels, together with the strengthening role of transnational companies in the formulation of global (not solely economic) processes. Meanwhile, processes at the local level also deserve research interest, especially corporate embeddedness, which has already raised several debates in different scientific fields. I agree with Enyedi (2012, 32) that the 'market economy's natural characteristic is the reproduction of inequalities', but I argue that economic actors - especially large companies - operating in second-tier cities could be **key actors** in the resolution of this paradox.

A main research interest is the actual potential of Hungary upgrading to a research and development location from its low-cost location status in the Central and Eastern European Region in the medium term.

My basic hypothesis is that corporate embedding is an ongoing process in Hungary with a strengthening tendency and that corporate embeddedness is a local level answer to global challenges for companies.

Spatiality of society and economy is currently in the frontline of research with special respect to 'new economic geography' as a research avenue through which we can discover space as the last frontier of economics (Krugman, 1998). Research in the field at the meso (local and microregional) level constitutes a radical shift in comparison to former economic research that characteristically neglected spatiality. This is the research avenue that I follow with the examination of the embedding process of transnational companies in their real-time local environment.

I identified the following research questions:

RQ1: Is corporate embedding process an ongoing phenomenon in Hungary?

RQ2: Can we describe the process of corporate embedding and the status of corporate embeddedness? If so, how?

RQ3: Can we define differences in the corporate embedding process based on spatiality, chronology and position?

RQ4: What are the influencing factors of corporate embedding?

RQ5: What are the advantages and disadvantages of corporate embeddedness to the company and the location?

I defined the following hypotheses:

H1: Corporate embedding process in Hungary is an ongoing phenomenon with a strengthening tendency.

H2: Both the process of corporate embedding and the status of corporate embeddedness could be described by process-based and qualitative models.

H3: Differences could be experienced in the process of corporate embedding based on spatiality, chronology and position.

H4: Corporate embedding is influenced by several identifiable factors.

H5: Both the advantages and disadvantages of corporate embeddedness could be identified in relation to the company and the location.

DATA AND METHOD

My research was based on the empirical observation that transnational (especially German-owned) companies in Hungary have started to move from the status of mass production entities to strategic organisations influencing the life of society and local community. This movement is motivated primarily - but not extensively - by their economic interests with the aim of seeking and exploiting locational advantages. My approach sees corporate embeddedness as one kind of a local level answer to the challenges of globalisation as - accepting the theses of new economic geography – their embeddedness in the local environment could yield competitive advantage through increased exploitation of the different kinds of 'relatedness' (Boschma, 2005). This advantage is not exclusively of an economic character, but also manifests itself in the attraction of higher value-added activities.

The process has two extensions in parallel with the time spent in the location; it has a horizontal (widening) and a vertical (deepening) aspect.

My intention was to identify, describe and understand these processes with scientific tools and accuracy.

Research Objects and Approach

Research objects were large multinational companies, as formal institutions, and I examined them in their local environment in a timeframe of 25 years between 1990 and 2015. The **three Hungarian case studies** were **Audi Hungaria Motor Kft. in Győr, Mercedes Benz Manufacturing Kft. in Kecskemét and Robert Bosch company group in Miskolc** (Józsa 2014).

I followed a **qualitative, inductive, empirical and company-based approach**. In contrast to previous extensive research literature on local municipalities, higher education institutions and bridge organisations; I examined the processes from the companies' perspective. The **multi case study analysis** formed a sound basis for the research and the main industrial focus was the automotive industry, even though one of the sites of Robert Bosch group in Miskolc is operating in the power tools sub-sector.

The selected case studies represent well the establishing, settling and embedding process of German companies in Hungary as they differ regarding geographic location, development status and economic structure, the period spent in the location and the position in the production chain (OEM, Original Equipment Manufacturer and Tier-1, first level supplier companies).

The settlement of Audi in Győr was one of the 'early birds', coming soon after the change of the regime in 1993 as a brownfield investment; Robert Bosch established two production facilities in Miskolc in 2001 (power tools) and 2003 (automotive); and Mercedes-Benz published its investment decision in 2008. The latter were greenfield investments.

The **complex set of selection criteria** of the case studies were the following:

1. different characteristics in geography, logistics, history, economic structure, traditions and society
2. different core-periphery status (though all examined locations are second-tier cities)
3. strong agglomeration/surrounding settlements
4. county capitals and prioritized centres with a population between 100,000 and 200,000 inhabitants
5. significant experience in Local Economic Development
6. the presence of both OEM (Original Equipment Manufacturer) and Tier 1 (direct or first level supplier) companies
7. German majority ownership but with different ownership structures
8. different stages of the development process and time horizon

The empirical analysis shed light on the similarities and differences in the embedding process, so I could identify, model and analyse the main milestones and stages of the corporate embedding process. **I intended to discover the patterns of the examined phenomena as the process of corporate embedding and the status of corporate embeddedness.** I examined the co-locations of the different factors and the indicator values also, for example the role of the nationality of the ownership, company size, sector and position.

Research Methods, Data Collection and Analysis

As there was no available and widely accepted model-based descriptive and analytical framework – beyond that, in Hungary the existence of corporate embeddedness has not been established and the definition has not been formulated yet – it was necessary to elaborate a new methodology. I adapted the **Quintuple (Penta) Helix innovation model** (Carayannis et al., 2012) as a basis, which is a developed form of the Triple Helix model (Etzkowitz; Leydesdorff, 1998). I analysed the relationship and embeddedness of the examined companies within the (1) local economy; (2) society; (3) science; (4) government; and (5) the natural and built environment.

I applied a mixed methodology that included desk-based research and primary research in the form of both questionnaires and semi-structured interviews. My intention was to examine the processes in their real-time environment both regarding the two main dimensions - space and time. My research was thus both exploratory and explanatory.

The applied methodology is summarized in *Table 1*.

Table 1: Summary of the Applied Research Methodology

Desk-based Research		Primary Research	
Analysis of Hungarian and international literature (more than 50% international references)	Automotive Region in Győr Research Project	Population survey, 2016 N=176 Location: Miskolc	Semi-structured interviews, 2016 N=10 Location: 3 cities
Analysis of statistical data	CURE International (FP7) Research Project (Corporate Culture and Regional Embeddedness)	- online (Google Form)	- corporate - municipality - higher education - professional organisations (executive level) and mental mapping
Analysis of policy documents, publicly available information Documentary review, Use of physical, technological, social, economic evidence		- snowball sampling - students at University of Miskolc	

Source: author's compilation, 2016

In the framework of the desk-based research I analysed the selected locations and companies based on a novel set of characteristics (*Table 2*).

Table 2: Factors of Desk-based Analysis of the Examined Locations and Companies

Object	Examined Factor	Indicator/Source of data
Locations	Local community	population and commuting data
		education level of population
		migration, population change
	Local economy	companies per 1000 inhabitants
		employment indicators per sector and gender
		economic weight of cities
		innovation potential
	Local education and science	performance value of investments
		local taxes and incomes
number, staff and expenditures in research and development		
geographic and logistical capacities		
City characteristics	Framework for industry settlement	comparative content analysis of Urban Development Concepts (for the period 2014-2030)
Companies	Subsequent location and development decisions	corporate and municipal documents, publications, databases, media, reports, internal reports and studies, websites
	Localisation and urbanisation effects	

Source: author's compilation, 2016

Composition and Characteristics of the Sample of Primary Research

Regarding the **composition and characteristics** of the population sample in Miskolc City it can be concluded that **gender representation** was balanced. Respondents under the age of 25 and between the age of 26 and 50 were slightly overrepresented, while the age group above 65 was slightly underrepresented in parallel (compared to national data of the last census in 2011). The majority of the sample belonged to an **active age group** of the population which was an important target group for the research (*Table 3*).

Table 3: Sociographic Characteristics of the Respondents of the Questionnaire Survey (N=176)

Description	Number of person	Ratio (%)
Gender		
Male	87	49
Female	89	51
Age		
18-25	17	10
26-35	52	30
36-50	67	38
51-65	31	18
66-	9	5
Education		
primary	1	1
secondary	30	17
tertiary (higher)	145	82
Residence		
Miskolc	121	69
agglomeration	37	21
other	18	10
Workplace (Employer)		
large company	37	21
SME	48	28
other	91	51

Source: author's compilation, 2016

Regarding **educational levels**, respondents with higher education were significantly over-represented in the sample, which could be the result of the sampling methodology (snowball sampling using the individual social networks of participants). Given the complexity of the topic, this over-representation of the respondents with higher education could be considered as acceptable. Regarding **residential status**, the sample was optimal and the same applies to **current employment** with an equal representation of corporate (21% at large companies and 28% at small and medium size companies, SMEs) and other employees. **The interviewees of the semi-structured interviews** were executive-level colleagues of the organisations within the Triple Helix in the examined locations.

RESEARCH RESULTS

I divided the presentation of the research results into six sub-chapters and summarized the new scientific results in a separate sub-chapter.

As an introduction, I analysed the three case studies from the perspective of local economic development. Then, I presented the results of the attitude survey. The primary research conducted was non-representative.

General Attitude towards Large Companies and Corporate Embedding

'Large companies are the slaveholders of modern age': The **general attitude** of the respondents and the interviewees was moderate (using a 1-5 scale). The most marked difference in opinion between the age groups occurred in this question, as the youngest respondents (under the age of 25) evaluated the statement as the least valid, and the elder generation (above the age of 65) as the most valid.

The opinion of the respondents under the age of 25 (Millennials, or Generation 'Y') about large companies is **more positive** than the average of the sample, as 13% are already employed by a large company, 56% were positive about being employed in the future, while 30% are not willing to be employed by a large company in the future either. The ratio of the same negative attitude in the average of the sample for male respondents was 45% and 55% for female respondents. The main keywords (attributions) mentioned by Generation 'Y' respondents on large companies were the increase in the quality of life, development, competitive revenue, good opportunities and international career, together with inflexibility, rigid regulations, robot work and intense labour turnover.

The evaluation of corporate embedding process of large companies into the local environment resulted in the appearance of a similar pattern of positive and negative attitudes. There was a significant correlation (Phi and Cramer's V values of SPSS-based analysis) between the assessment of corporate embedding and the current workplace, as the respondents currently employed by large companies assessed the degree of corporate embeddedness as higher compared to those working at other organisations. Thus, research results show that the assessment of corporate embeddedness by the local population is strongly dependent on the specific personal perceptions and life situation.

As a summary, it can be stated that based on the results of the primary research, **corporate embedding is an existing phenomenon according to the views of both the respondents and the interviewees**. The research subjects were highly likely to **mark corporate embedding as an existent and ongoing process** (94% of respondents of the questionnaire and 100% of the interviewees).

Regarding the assessment of the realisation of corporate embedding as being partial or entire (absolute) **the majority opted for partial embedding.**

Another interesting result is that when **the definition of corporate embedding** was raised as a question, **60% of the local respondents** stated that they could provide a definition and they also managed to describe the phenomenon. That is a very high proportion considering both the complexity of the topic and the average ratio of responses for elaborative answers. Without receiving any orientation or prompts for this exercise, the respondents mentioned in their definitions the **economic dimension** in 62 cases, the **social dimension** in 37, the **scientific dimension** (including – dual - secondary and higher education) in 17, the local government dimension in 11 and the natural and built environment in 11 cases.

Elements of the Host Context of Corporate Embedding

Based on the opinion of respondents on the five elements (Penta Helix) of the host context, companies embed the most into the economy, then into science (a surprising result, as I expected society being at the first or second place), society, local government and the natural and built environment (*Chart 1*).

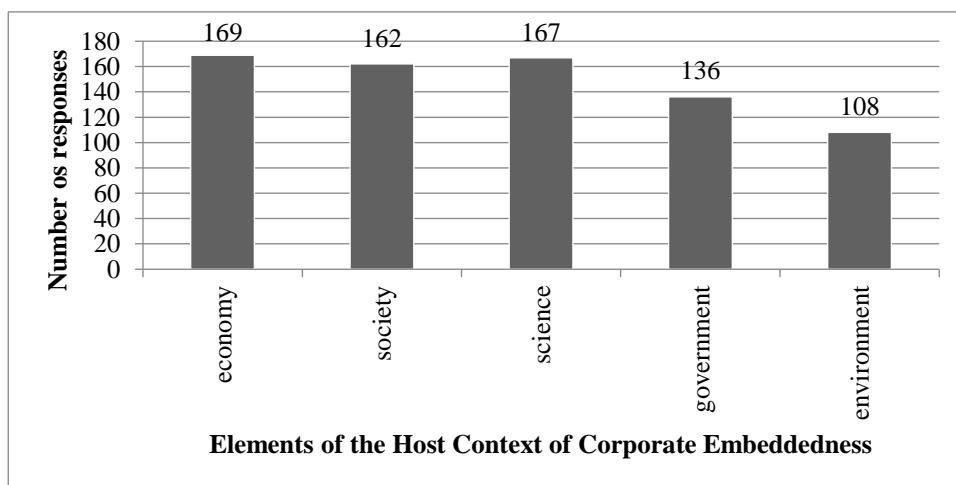


Chart 1: Opinion of Local Respondents on the Elements of the Host Context

Source: author's compilation based on results of primary research, 2016

These results exceeded expectations and should be highlighted given that neither the Hungarian scientific literature nor the media have discussed the phenomenon in the past years in detail and with a wide audience. Thus, the topic could be considered as under-researched. **As a summary**, it can be concluded that **the five examined elements** (belonging to 'internal' and 'external' spaces (Nemes Nagy, 2009) **are appropriate** for the definition of the host context of corporate embedding, and **respondents perceived embedding in all the five dimensions**, though in different degrees.

Phases and Comparative Analysis of Corporate Embedding Process

I elaborated a general process model for corporate embedding and identified the main phases (*Chart 2*)¹.

Phase 1: Settling

from company through Start of Production (SOP) to scale-up operation, Corporate Social Responsibility (CSR) activities, dual education; capacity increase, product diversification, extensions, research and development and employee-related measures;

Phase 2: Extension

other investments, new functions like renewable energy, road connection, logistics, health services, commuting, housing support, networking and strategic programming.

Phase 3: Structured Embedding

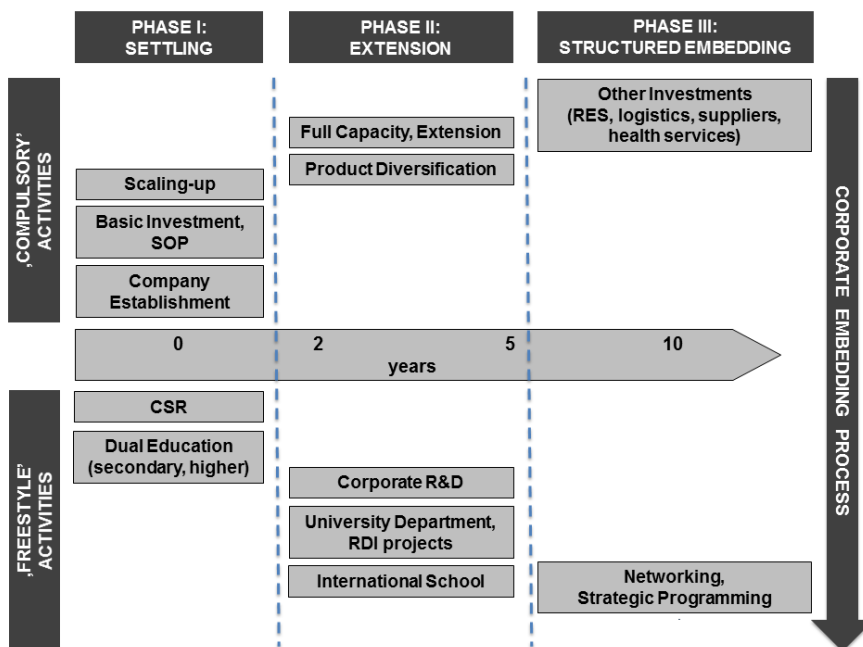


Chart 2: Phases of Corporate Embedding

Source: author's compilation, 2016

I highlighted two important factors in connection to the identified phases as 'time horizon' (traditions and characteristics of the location and their connection with the speed of the embedding process) and 'embedding protocol' (the pre-designed modules and building blocks from the mother company and their tailoring and optimisation to local characteristics).

¹ I identified 'compulsory' or core activities as directly connected to production and 'freestyle' activities that are of a rather strategic character and are not prerequisites of production.

1. Innovation with Technology-related Traditions (Audi - Győr)

Introduction of ‘freestyle’ activities (2001) followed ‘compulsory’ activities (1993) with relative delay (compared to the other two cases) by the establishment of corporate RDI and dual vocational training. The examined period is almost 25 years. It can be argued that this was related to the **‘pioneer’ status and the characteristics of the post-socialist environment**. Local government has been active and supportive from the first moment. Today Győr is a strategic location for Audi and the cooperation has been widened to a multi-player life career model (*Chart 3*).

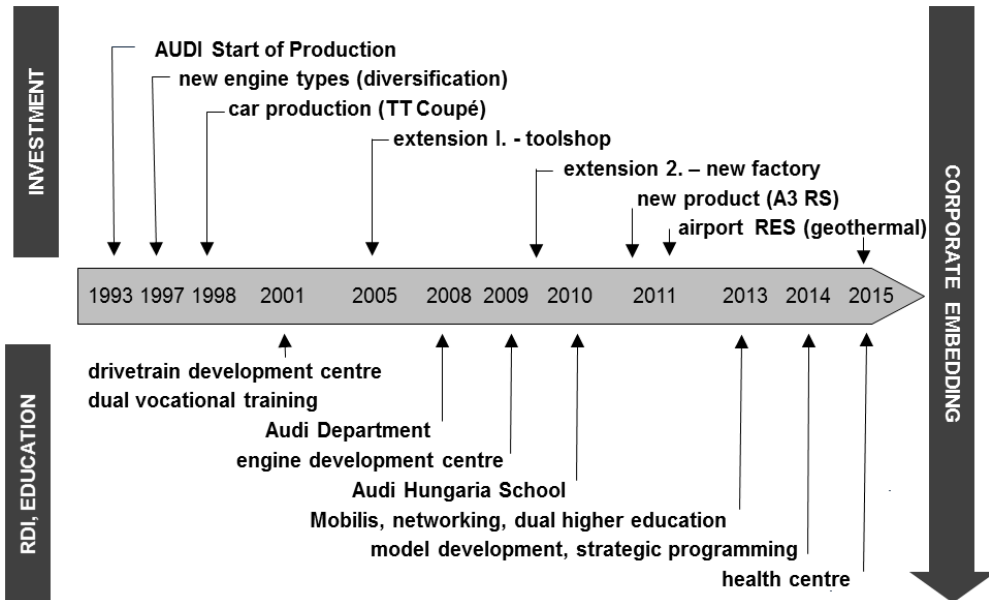


Chart 3: Milestones of Corporate Embedding of Audi - Győr

Source: author's compilation, 2016

2. We Build Our Common Future (Robert Bosch – Miskolc)

The power tools factory (PTHU, Robert Bosch Power Tool Kft.) was established at first, and was followed by the automotive plant (RBHM, Robert Bosch Energy and Body Systems Kft.). The examined period is almost 15 years and **the acceleration of the process can be detected**. ‘Freestyle’ activities were started soon after the start of production with the establishment of the Robert Bosch Department at the University of Miskolc. Dual education and international kindergarten and school followed with a small delay, but from then on, an intensive phase has succeeded. Today, Miskolc is a strategic location for Bosch and there are **continuous development activities within an integrated approach** (*Chart 4*).

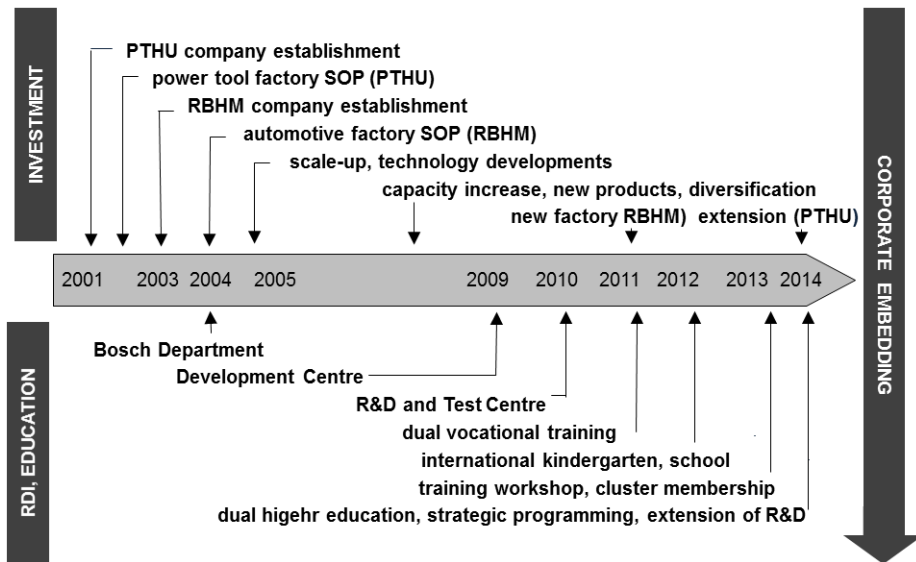


Chart 4: Milestones of Corporate Embedding of Robert Bosch Group - Miskolc
 Source: author's compilation, 2016

3. Optimisation of Dynamism and Environment (Mercedes – Kecskemét)

The location decision of Mercedes was made in 2008, but the start of production was launched only in 2012. Possible reasons could be the global economic crisis and the necessary wait for a **critical mass** of resources from both the corporate and the local government side. The examined period is more than 5 years. The first specific feature of the case study is that dual vocational training cooperation was started right after the location decision and dual higher education, in parallel with the SOP. Thus, a **further acceleration** and the **repositioning of dual education** can be observed. The second feature is the **lack of R&D** activities – as part of corporate level RDI strategy – but a strong focus on international kindergarten and supplier (re)location. Daily contact and good cooperation with local government are assured (Chart 5).

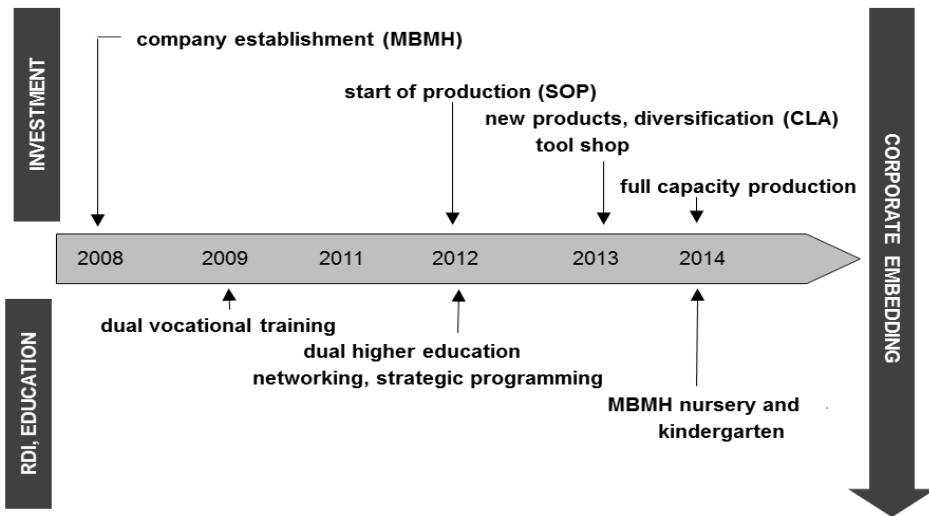


Chart 5: Milestones of Corporate Embedding of Mercedes - Kecskemét
Source: author's compilation, 2016

Based on the analysis of the ‘compulsory’ activities, it can be stated that the activities under Phase 1 and Phase 2 have been realised in all examined cases. Additionally, the time horizon has been significantly decreased, which points to the continuous acceleration of the activities in the past 25 years after the change of the regime.

The most important observations are:

- (1) the acceleration of the subsequent development decisions and connected activities;
- (2) the necessity of a critical mass of ‘hard’ and ‘soft’ factors (*Table 4*);
- (3) the appearance of other, modern infrastructure development activities that result an extension of the functions.

The same acceleration could be observed in case of the ‘freestyle’ activities but in this case the activities are not as directly track-based as in case of the core activities, so not all activities are necessarily present, and there may also be changes on the order of appearance of some activities.

The most important observations are:

- (1) the appearance and importance of dual education from the very first steps;
- (2) the importance of local networking and strategic programming, especially from 2010;
- (3) openness and clear willingness towards cooperation.

Factors Influencing the Corporate Embedding Process

The corporate embedding process **could be influenced by several factors**. Based on desk and primary research I identified the **possible factors** and in some cases I found evidence to support **their influencing effect**. I summarised the examined factors, their description and their identified effects in *Table 4*.

I highlight the fact that **my approach was corporate-focused**, so the division of the identified factors to ‘internal’ and ‘external’ sub-groups was based on the companies’ perspective.

External factors were the geographic location, the political-economic situation, the position in settlement hierarchy, the time horizon and the local supporting environment (‘hard’ factors).

Internal factors were company ownership, size of the company, position in production chain, the sectoral position, the number of sites and ‘core’ and other activities at the site.

Table 4: Summary of Factors Influencing the Corporate Embedding Process

Factor	Description	Result (yes/no, and specification)
geographic location	<u>Western Hungary</u> / Budapest / Eastern Hungary	stronger embedding in Western Hungary
political-economic situation	regional stability, structural crisis	no evidence of influence
position in settlement hierarchy	capital / <u>county capital (mid-size city)</u> / small city / village	county capitals are optimal
time horizon, chronology	<u>longer time spent from SOP</u> / recently settled	clear positive correlation
local supporting environment ('hard' factors)	developed/less-developed region, accessibility, available industrial area	decisive in location decision
local supporting environment ('soft' factors)	local government, supplier network, clusters, dual training and education, international kindergarten and school	decisive during embedding process
company ownership	Hungarian / Foreign / Transnational	no significant correlation indicated
size of company	SME / large company	no significant correlation indicated
position in production chain	OEM / Tier 1 level company	typical differences
sectoral position	<u>automotive</u> , electronics, pharmaceutical industry, ICT technology/labour-intensive industry, agriculture/industry/services	significant differences , positive in case of automotive, negative in case of ICT
number of sites	one / more production sites in a country	no significant correlation indicated
'core' and other activities at the site	production / testing / RDI / others, ... based on added-value	positive relationship between value-added and embedding
others:	number of employees, age of company, employment potential, size of the site, personal factors, individual relationships, management, nationality of executives, special 'niche' knowledge, culture of the mother company, 'soft' EU incentives	stronger embedding above 4-5,000 employees, harmony between 'host' and 'brought' cultural capital, typical activities to specific company maturity status, incentives could assist

Source: author's compilation, 2016

Status Model of Corporate Embeddedness

Regarding the status of embeddedness, I also elaborated a **general status model** (*Chart 6*) that I tested on the specific case studies.

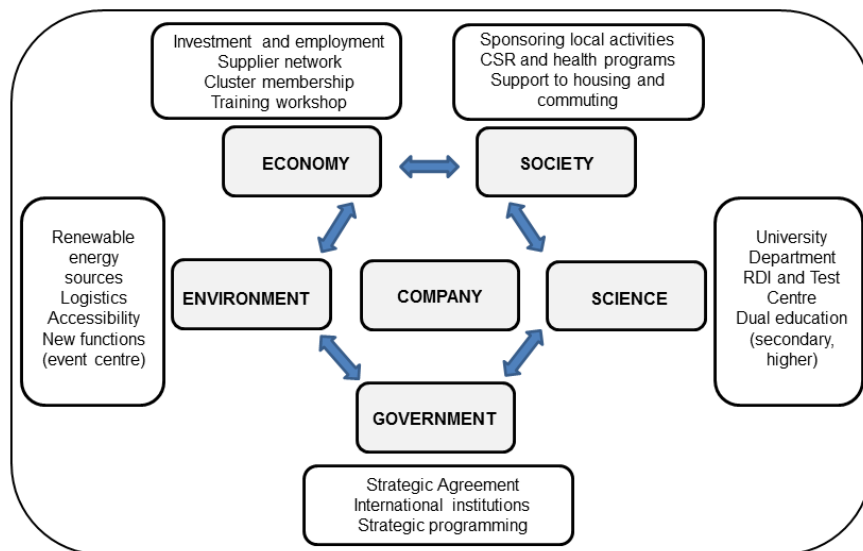


Chart 6: Status Model of Corporate Embeddedness

Source: author's compilation, 2016

As a result of my research, I **proposed a definition** of both the process of corporate embedding and the status of corporate embeddedness that I described with the increasing **degree** (depth as a **vertical** dimension) and widening **scope** (extent as a **horizontal** dimension) of the definiteness (interdependence) between the company and its host context.

Comparative Analysis of Corporate Embeddedness

These **two dimensions can be captured well on the visualisation** of the comparative analysis (*Chart 7*). Emphasizing some results, **Audi and Bosch are more embedded** than Mercedes, but its relative lag could not be defined as significant concerning research results on the acceleration of the embedding process. **Audi's embeddedness is the most balanced** while **Bosch outperforms the others in the economic and scientific dimensions**, which illustrated well the difference between OEM and the Tier-1 companies, also established by both primary and desk-based research results. Bosch companies are members of a regional cluster and undertook the responsibility to participate in large-scale consortium-level RDI projects. **Significant dual education cooperation of Mercedes** is overshadowed by the lack of RDI activities but its efforts towards the **strengthening of the local supplier network** are appreciated.

A relative ‘distance’ to local government can be observed in all cases, which can be due to the possibly negative, ‘too strong’ embeddedness and unintended interrelations. These findings are consistent with the theories of Uzzi (1997), and Boschma and Capone (2016), and underlined by the interviewees.

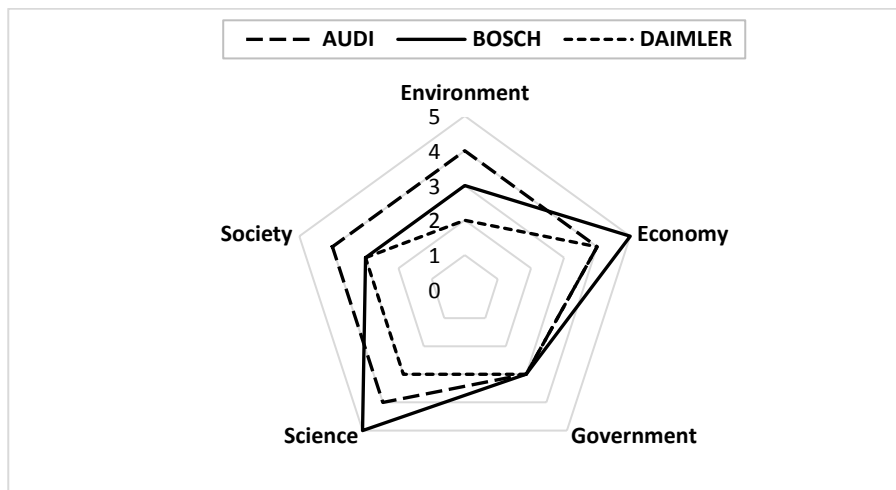


Chart 7: Comparative Model of Embeddedness of the Examined Companies
Source: author's compilation, 2016

Legend:

0= no initiative

1= relevant policy exists (at company or corporate level)

2= informal cooperation exists (e.g.: personal relationship)

3= formalised cooperation exists (e.g.: Chamber, Association)

4= formalised, institutional bilateral cooperation exists (e.g.: Department, project cooperation)

5= networked, institutionalised cooperation exists (cluster membership, project consortium)

Impacts of Corporate Embeddedness

I summarised **the impacts of corporate embeddedness** for the company (localisation effects) and the location (urbanisation effects) in *Table 5*.

Table 5: Advantages and Disadvantages of Corporate Embeddedness

	Advantages/Possibilities	Disadvantages/Threats
COMPANY	better workforce supply	‘narrow’ base, limitations
	higher quality of life for executives, quicker integration	getting ‘too close’ to politics
	one-stop-shop , reduced red-tape	higher opportunity for corruption
	strengthened labour attractivity	increased wages, competition
LOCALISATION EFFECTS	developed supplier network	higher fixed capital, lower relocation flexibility
	more profit , better competitiveness ‘ tailoring the environment to company needs’	is it worth it? pay-off of investments in the longer term
COMPANY AND LOCATION	good image , international reputation	others are ‘ copying ’ the initiatives
	higher growth potential	reduced flexibility , ‘strings attached’
	regular information change and negotiations	unintended interrelations, the bonding effect of institutionalisation
	widened financial opportunities (EU funds, allowances, state aids, taxes paid)	
LOCATION URBANISATION EFFECTS	targeted infrastructure development	increased environmental impacts , bottlenecks, overcrowded public spaces, reduced liveability city=company as a negative factor (e.g.: in new location decisions for OEMs)
	image-forming, upgrading power, increased dynamism	
	operation of the large company as ‘ investment magnet ’	
	retention of skilled inhabitants	workforce extraction from SMEs
	strengthened RDI competences , institutionalisation	narrowed education and RDI structure , passivity
	widened local service palette , solvent local demand	development of agglomeration, increased commuting, increased segregation
	appreciation of local real estates	
	dissemination of culture represented and requested by the company	
	strengthened and novel endogenous development factors	decreased resiliency in case of a sectoral shock, neglect of other actors
	support for community development	
strengthened local intellectual community , ‘ smart citizenship ’		

Source: author’s compilation, 2016

As a summary, it can be stated that corporate embeddedness has a fundamentally positive impact on several aspects of sustainable local economic development, including economic, social and environmental sustainability and the factors of city success.

Verification of Hypotheses and New Scientific Results

Based on the examination of the hypothesis I formulated the following results:

H1: Corporate embedding process in Hungary is an ongoing phenomenon with a strengthening tendency.

Based on both primary and desk-based research I consider the first hypothesis as **fully established and acceptable**. Corporate embedding is a contemporary phenomenon in Hungary and it has both a deepening and a widening character. The process is ‘visible’ and recognisable for the respondents of the questionnaire (inhabitants in Miskolc) and the interviewees (executives of the triple helix organisations in the three examined cities) also. I divided the elaborated process model to two main types of activities as (1) core or ‘compulsory’ and (2) non-core or ‘freestyle’ activities and I identified the specific steps as milestones of the process under each activity type. I tested the general process model on the case studies and the identified milestones were completed in a large extent; though sometimes with the lack or repositioning of a specific step. The continuous acceleration of the corporate embedding process was an important observation. I identified three main phases in corporate embedding that are directly connected to the formation of the company’s production system that are the settling, the extension and the structured embedding.

Based on my research I formulate my first thesis as follows:

T1: Corporate embedding is a contemporary process in Hungary with a strengthening character that has separable phases as settling, extension and structured embedding.

H2: Both the process of corporate embedding and the status of corporate embeddedness could be described by process-based and qualitative models.

I consider the second hypothesis as **fully established and acceptable** with the completion that the applied methodology facilitates the analysis of qualitative changes and comparisons. Additionally, the five elements of the Penta Helix model were recognised as dimensions of the host context for corporate embedding. Both the elaborated process model of corporate embedding, and the enhancement and application of the Penta Helix model in the context of corporate embeddedness, are new research results. Regarding the dimensions of the host context (economy, science, government, society, natural and built environment), institutionalisation in some cases constitutes a challenge, but this does not question its relevance or conceptual pertinence.

As my basic objective during the elaboration and testing of the models was not the analysis of the institutionalised connections, but the exploration and understanding of corporate embedding into the local ‘urban texture’, I took into consideration both the formal and informal connections to fully discover the impact mechanisms.

Based on my research I formulate my second thesis as follows:

T2: Both the process of corporate embedding and the status of corporate embeddedness could be described with process-based models, targeting the measurement of qualitative changes. In these models, elements of the host context of corporate embeddedness are the economy, science, government, society (as 'internal' spaces) and the natural and built environment (as 'external' space). With these models, both the vertical dimension (depth) and the horizontal dimension (extent) of corporate embeddedness can be measured and visualised.

H3: Differences could be experienced in the process of corporate embedding based on spatiality, chronology and position.

Regarding the third hypothesis, I can accept it only **in a generalised form** as corporate embedding could differ in case of specific companies and locations, though it is possible to model the process.

Under position I meant the core-periphery status of an area, the economic-political-developmental situation, and the position of the company in the production chain (e.g.: OEM or Tier-1). My research established only partially these as differentiating factors, the only difference I could demonstrate was the presence of strong research and development activities in case of Tier-1 supplier level. Regarding spatiality - although respondents and interviewees confirmed that the contribution of large companies in local activities is higher in Western Hungary than in the Eastern part of the country – the only difference that I could discover was the relatively slower embedding process. As this could be directly and strongly influenced by the chronology ('pioneer' status of the company and characteristics of the post-socialist, transition era), chronology and spatiality were in a strong and direct connection.

Based on my research I formulate my third thesis as follows:

T3: The corporate embedding process could differ in case of specific companies and locations, though it is possible to model the process.

H4: Corporate embedding is influenced by several identifiable factors.

I consider the fourth hypothesis as **fully established and acceptable**, and in the same time it serves as the identification of the third thesis, as in the framework of the research I identified several factors that could influence corporate embedding. Both desk-based and primary research results established the influence of these factors. Corporate embedding of German-owned companies and companies in automotive industry, for example, is stronger than that of Asian companies (whose culture is more distant to the Hungarian one), or pharmaceutical industry companies with a close technology chain. Corporate embedding is also less intense in case of ICT (information-communication technology) companies that are strongly globalised from the very first moment of establishment.

The amount of value-added produced at the production site is in a positive correlation with corporate embedding. Research also highlighted that mid-size cities (county capitals) provide the optimal mix of prerequisites, as locations for corporate embedding.

Based on my research I formulate my fourth thesis as follows:

T4: The corporate embedding process is influenced by several well-identifiable factors that are for instance the dominant corporate and national culture, the industrial sector, the value-added produced at the specific site, the period spent from the settling and the framework conditions provided by the host context with special respect to the 'soft' factors.

H5: Both the advantages and disadvantages of corporate embeddedness could be identified in relation to the company and the location.

I consider the fifth hypothesis as **fully established and acceptable**, as I identified and systematized several positive and negative impacts of corporate embeddedness. As a basis, I used the set of criteria for city success (Enyedi, 1997) on the one hand, and localisation (company-oriented) and urbanisation (location-oriented) effects and their section on the other hand. Regarding the impacts of corporate embeddedness, the advantages are of decisive importance.

Based on my research I formulate my fourth thesis as follows:

T5: The impacts of corporate embeddedness could be identified from both the company's perspective (localisation effects) and the host context's perspective (urbanisation effects) and the advantages are of decisive importance. The criteria of city success constitute a good framework for the systematization of the impacts of corporate embeddedness.

The innovative character of my research is threefold. Firstly, compared to previous studies focusing on local governments and higher education actors, I examined the processes from the perspective of the companies. Secondly, instead of quantitative, (project) indicator-, and statistical data-based analysis, I applied a process-based, qualitative methodology that could detect and analyse correlations and qualitative changes. Thirdly, I elaborated novel models to be applied in other research and policy-oriented activities, and provided the opportunity to further develop and adapt contemporary innovation models in local, real-time environment.

New Scientific Results of the Research

In contrast to previous studies, the process of embedding and the status of embeddedness was explored from the large company's perspective through the analysis of the changing relationship between the company and its host context. An important innovative element of my research is the local (meso) level examination of the phenomena compared to former studies focusing on the National Innovation System (NIS), Regional Innovation System (RIS) and Metropolitan Innovation System (MIS) level.

Result 1:

I established and justified with my research **the relevance of the five dimensions of the host context** for corporate embedding, based on the Penta Helix model, and their 'visibility' and perceivability for local inhabitants and other stakeholders.

Result 2:

Based on my analysis, I proposed as **a new definition:** that **corporate embedding** is a process laid in a particular 'external' and/or 'internal' space through which the interconnectedness between a specific economic organisation and its surrounding context is strengthening in its degree (vertical direction or depth) and widening in its scope (horizontal direction or extent). **Corporate embeddedness** is a status reached by the process of corporate embedding that could be characterised by the degree (depth) and scope (extent) of the interconnectedness between the particular company and the surrounding context.

Result 3:

Regarding the process of corporate embedding, **I identified novel factors** and the **main milestones and phases** of the process that I visualised in a **new process model**. Regarding **the influencing factors** of corporate embedding, I separated the potential external and internal influencing factors from the company's perspective and identified those, where significant correlation could be detected.

Result 4:

Regarding the status of corporate embeddedness, I elaborated a **novel status model** for the definition and measurement of the phenomenon by the further development of the Penta Helix model that facilitates the measurement, comparison and visualisation of the embeddedness of specific companies. The research results confirmed that corporate embeddedness of large companies is of **outstanding importance** concerning sustainable local economic development and its **impact is decisively positive**.

CONCLUSIONS AND RECOMMENDATIONS

'History is not shaped by blind forces merely, but conscious people who owe responsibility for their actions. The main historical responsibility falls on political decision-makers. However, besides them, in the second line, consultants from the academic world are also responsible for their words.'
(Kornai, 2007, 63)

As a conclusion of the research we can highlight **the necessity and importance of the completion of local economic development activities**. The corporate embedding process requires significant resources, a distinctive mindset and commitment from all participating actors. Primary research explored the openness, interest and **positive attitude of generation 'Y'** towards transnational companies operating in their local environment, together with the relatively low 'visibility' of the connection between the company and the local government. Besides, the claim for regular, institutionalised 'platforms' of information exchange and common thinking activities was also raised.

Thus, **it is recommended in relation to the host context** for effective corporate embedding to:

- separate local economic development activities from local politics and to integrate all local political and other forces, with special respect to intellectuals;
- establish and maintain the platforms of regular, bilateral and multilateral communication;
- disseminate more effectively the local economic development actions toward local inhabitants, with special respect to millennials.

Regarding the process of corporate embedding, the research results provided strong evidence that corporate embedding is **a contemporary phenomenon** in Hungary, and that **it has both a deepening and a widening character**. The process is 'visible' and recognisable for the respondents of the questionnaire (inhabitants in Miskolc) and the interviewees (executives of the triple helix organisations in the three examined cities) also. In relation to sectoral and spatial effects, we can conclude that the central area of the automotive industry is still in East-West-Transdanubia, with a slow but recognisable tendency of foreign direct investment to move towards the Eastern part of the country. The importance of networking and clustering has been strengthened and the border between exogenous and endogenous development factors is less definite. The **corporate embedding process could be modelled** and the **continuous acceleration** of the process is an important conclusion.

There are **three main phases** in the process, directly connected to the formation of the company's production system: settling, extending and the structured embedding. These three separate phases have their specific features, but, the research results revealed **several changes**. Previously, CSR activities were connected to the first phase, while recently dual education at both secondary and higher level has been repositioned, most likely due to the lack of a skilled workforce that has become more and more critical recently. Another conclusion concerns the **potential for research and development** cooperation, especially at Tier-1 level. Efforts of the national government towards strengthened corporate RDI (research and development and innovation) activities are welcome by industrial actors, but the approximation of the current regulatory-, procedural- and institutional systems towards real corporate RDI processes and their specific criteria is required fully to support better cooperation.

Thus, **it is recommended in connection to corporate embedding** to:

- strengthen the RDI capacities, and most importantly the competences of mid-size cities (county capitals) and establish cooperation systems between the stakeholders of the Triple Helix;
- introduce supportive demand-driven measures and interventions based on the identified milestones of the process model in the framework of 'smart regulation' with the aim to generate and accelerate the process;
- increase the 'international visibility' of these mid-size cities as future optimal locations for higher value-added 're-industrialisation' activities.

Regarding corporate embeddedness, the examined companies could be considered as ones with **medium-to-strong levels of embeddedness** that would be further deepened and widened, based on the plans of the actors. The adapted and further developed (quantified) Penta Helix Model was appropriate to measure, compare and visualise corporate embeddedness. **Both the developed process model and the status model are suitable and appropriate** for the modelling, description, visualisation and comparison of the examined phenomena. Institutionalisation in case of some elements constitutes a challenge, and even the interpretation of the phenomenon could be different. In the meantime, the narrowing of the target group (companies) for national, regional and local incentives is not justified, as the research did not reveal significant differences about ownership or company size. On the other hand, some specific features were identified in connection to the maturity of the companies, the industrial sector and the "brought" culture of the dominant nation or mother company. Networking and strategic programming have a high importance and large companies are open and willing to cooperate.

There is still **significant potential** in future cooperation in the field of dual education and training, city brand development, career model development, and higher quality of life measures (e.g.: healthcare, commuting, housing).

Thus, **it is recommended in connection to corporate embeddedness** to:

- introduce a novel, quality- and process-focused incentive and monitoring scheme in the field of RDI and economic development support;
- widen the scope of beneficiaries of corporate embeddedness in local communities to indirect beneficiaries, that could only be achieved through the cooperation of institutionalised actors (including civil actors);
- reach out to millennials and generate community development with the aim to retain and attract a skilled workforce and strengthen the development potential.

Transnational companies are more and more active in their local host context and engage in a wide scale of activities other than production that contribute to both city success and sustainable local economic development.

Research results underlined the conclusion of Reznitzer (2016, 247) on the **necessity to widen the Triple Helix model into the Quadruple Helix**, with the involvement of the local society. However, I argue that **it is time to add a fifth element** – namely the natural and built environment - to the model.

Additionally, I propose that there is a very strong case for further research activities in Hungary and in the Central and Eastern European Region in this currently under-researched area, in which there is an outstanding potential. This would contribute to the elaboration of ‘smarter’ policies and the introduction of more efficient, quality-based interventions that would result in the reduction of regional inequalities as well as increased competitiveness.

Regions – locations from the viewpoint of companies - have become parts of global networks and the question is to what extent large companies could advance the development and success of a specific area and what is the level of willingness and ability of the particular area to contribute towards the necessary learning and change.

As a summary, it can be stated that the objective of national development policy to upgrade from low cost location to a higher value added research and development and innovation site in the CEE region could become a reality in the mid-term with the cooperation of large companies and other stakeholders in their host context.

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