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Implementation of dual apprenticeship structures in german plants abroad: Boundary Objects in educational transfer

*Implementación de estructuras de aprendizaje
dual en plantas alemanas en el extranjero:
Boundary Objects en transferencia educacional*

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Abstract

The article at hand intends to learn about companies' attempts to transfer educational concepts by means of a case study. The investigated cases come from the automotive industry and a comparative approach (USA, South Africa) is used here to focus on the implementation and development of dual apprenticeship structures. How do German manufacturers abroad, in this case a German MNC, build up cooperations within very different cultural environments? The theoretical approach is, coming from Engeström's activity theory, the concept of boundary objects with regard to boundary crossing. The results show the different approaches of both cases to build up dual training structures abroad successfully. In the discussion, boundary objects are being identified and assigned to three categories: path dependency, organizational learning and innovation.

Key Words: Boundary Objects; Vocational Education and Training; Educational Transfer; Activity Theory; MNC; Mercedes-Benz

Resumen

Este artículo tiene el propósito de aprender sobre la intención de las empresas en transferir conceptos educacionales a través de un caso práctico. Los casos investigados provienen de la industria del automóvil donde se utilizó un enfoque comparativo (EE.UU., Sudáfrica) para centrarse en la implementación y desarrollo de estructuras de aprendizaje dual. Cómo hacen los productores alemanes en el extranjero, en este caso una corporación multinacional alemana, para crear cooperaciones en ambientes culturales muy diferentes? El enfoque teórico es el concepto de Boundary Objects, proveniente de la Teoría de la Actividad de Engeström, en referencia al cruce de fronteras. Los resultados muestran los diferentes enfoques en ambos casos para desarrollar estructuras de formación dual en el extranjero exitosamente. En la discusión, boundary objects están siendo identificados y asignados a tres diferentes categorías: dependencia del camino, aprendizaje organizacional e innovación.

Palabras clave: Boundary Objects; Formación Profesional; Transferencia Educacional; Teoría de la Actividad; MNC; Corporación Multinacional; Mercedes-Benz

1. Problem statement

The starting point of this investigation is the current discussion on educational transfer. For some time now, efforts were made to develop vocational education systems in countries where vocational education and training (VET) programs are not traditionally cultivated. The German government, for example, promoted measures to strengthen VET in more than 80 developing countries with investing 125 Mio. Euro in 2012 (BMBF, 2014). According to the Riga conclusions in 2015, ministers responsible for VET of countries participating in the Copenhagen process decided inter alia to reinforce the 2020 vision for VET and to strengthen partnerships with social partners and other relevant stakeholders such as chambers, other institutions and companies (European Commission, 2015). These examples indicate the relevance of educational transfer and suggest that the German VET system might be transferable to other countries. This is exactly the crux of the matter: Is it possible to transfer an educational system to another context such as different nations? If an educational system can be implemented into a different context, is the adapted system simply a copy of the original or does its new context shape it into an entirely different organization that has deviated from its original appearance (see for example Euler, 2013; Bliem *et al.*, 2014)?

Nevertheless, the aforementioned examples disregard companies' perspectives. Unlike certain institutions, for-profit companies are responsible for implementing their own vocational skills programmes. Consequently, some German companies try to establish a dual training program. This essay considers the German automotive company Mercedes-Benz – an establishment with 17 production sites worldwide. In several plants, elements of a dual training system have recently been or are already established at the moment. For example, in the Mercedes production site in Tuscaloosa, U.S., the establishment of dual structures has already undergone its pilot phase (in autumn 2011, the apprenticeship programs for the professions “Industrial Mechatronics” and “Automotive Technician” began and have ran successfully so far). In the Mercedes plant in East London, South Africa, a trainer from Bremen, Germany is currently on-site to build up new training structures due to the success in the U.S.

These two foreign plants can be compared to one another. In this comparative context, cooperations – between vocational schools and the employer, for example – and its problems and challenges are important aspects. This generates the main research questions:

“How and with what tools do companies such as Mercedes-Benz establish dual apprenticeship systems in different foreign countries? Do the companies solve the cooperation problem?”

2. Theoretical approach

In an analysis of cooperative relations, organizational research that describes concrete activities is especially fruitful for understanding cooperation. Often, this research investigates structural changes, interdependences between work and organization and changes in organizational culture (Schaal, 2009). In the long run, changes within an organization mean that some kind of development, usually some learning, has taken place also in the context of cooperation. This learning requires moving beyond boundaries, such

as “borders in the head“ and directly overcoming institutional obstacles. This process is captured by the term *boundary crossing*, which can be used to analyse learning in hybrid and multi-organisational context (Engeström & Sannino, 2010). Engeström details the concepts of “boundary objects” and “boundary crossing” in his larger “activity theory”.

The term “boundary objects” was coined by Star and Griesemer (1989) in their study “Berkeley’s Museum of Vertebrate Zoology,” where they defined a boundary object as an object that lives in multiple social worlds and which has different identities in each” (p. 409). Boundary objects are presented as “brokers” in the literature (see for example, Kimble *et al.*, 2010, p. 438). This term has a symbolic origin, since brokers also concern themselves with communication between different communities. Boundary objects can help boundary crossing by acting as a translation device that mediates between different participants and institutions. The concept of boundary objects with regard to activity systems analysis can serve as a theoretical framework for answering the research questions concerning dual apprenticeship programs and cooperation problems which can occur.

In the following, the concept by Star and Griesemer (1989) is presented.

2.1. Types of boundary objects

Boundary objects can be material items, as well as abstract ideas and thoughts. Participants from different social worlds use boundary objects to translate and express their respective interests. On the one hand, they address their aims to the object; on the other hand, they differentiate themselves from each other using the object. Thus a boundary object fulfills the function of the object from the activity system, because an object is frequently part of different activity systems (Schaal, 2009). Star and Griesemer (1989) define four ideal types of boundary objects, these are (1) ideal types, (2) repositories, (3) coincident boundaries and (4) standardized forms (Star & Griesemer, 1989, p. 410 ff.):

1. Ideal types are highly abstracted objects, which describe few concrete details of a thing. One example for an ideal type is an atlas. They use symbols, to speak about the same object from different perspectives. At the same time, ideal types make precision possible in a specific context.
2. Repositories are characterized by modularity, meaning that they contain existing components which are used depending on the situation. A library is an example here. Libraries allow users to help themselves without having to engage in negotiation. Individual components (e.g., books, shelves) can be removed without threatening the entire structure of the system.
3. Coincident boundaries are objects that share the same boundaries but are different in their content. This can be understood as the “lowest common denominator”. For example, the same object (e.g. a map) can emphasize various features: One map may show the most beautiful viewpoints and picnic areas for hikers while another map of the same region may show speedy and slow highways for drivers.
4. Standardized forms are communication forms that make mediation possible by standardization. For example if course participants speak different languages and English is the shared language. Another example is that of a medical history form for patients in which all information about a patient is collected and is sent to other physicians or hospitals if necessary.

It becomes clear that boundary objects would be missing substance without taking into account an activity system (see figure 1).

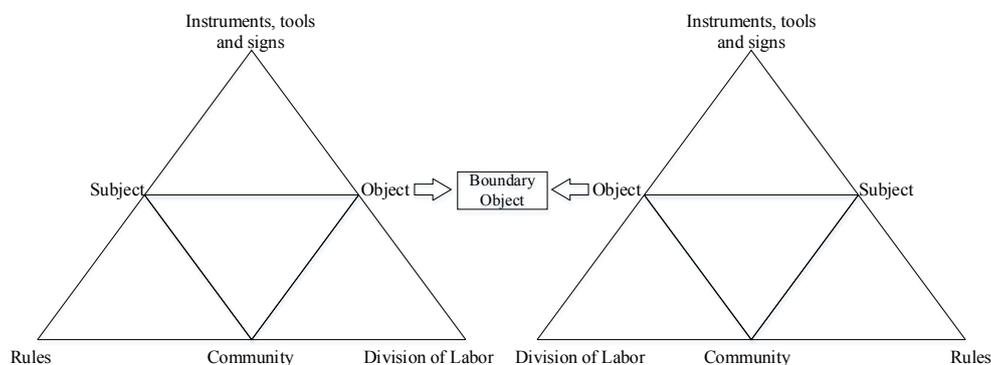


Figure 1. Boundary object as connection of two activity systems.. **Source:** Based on Akkermann & Bakker, 2011, p. 139; Schaal, 2009, p. 34

2.2. Cooperation and boundaries

Companies are constantly re-defining their organizations by adjusting their practices according to new social and technological developments. In order to keep up with competitors, customer-oriented services and flexible offers have to be provided. An increased adjustment between suppliers and customers becomes necessary, resulting in the establishment of a successful transnational cooperation (Engeström, 2008). It can be assumed that these transnational cooperation considerably affect companies' work activity (Geithner, 2014). For example, a company will adapt its products according to its competitors, to partner companies and to customer wishes. These various interactions require adequate tools and rules of cooperation as well as a shared understanding regarding the cooperative object. Okhuysen *et al.* (2013) describe cooperation as "boundary activity". "Boundary crossing" acts as a sign of cooperation between and within organizations considering rising interlaced working (Engeström, 2009). Lompscher (2004, p. 158) states that the individual is thus challenged to question the boundaries, to reach a common view on the subject of activity and to coordinate the actions, means, and rules of the activity system; this leads to changes in the entire activity system and in the community to the overcoming of boundaries.

Oswik and Robertson (2009) stress that *boundary objects* are too often reduced to their role as transformation devices; although they actually serve multiple functions including acting as the subjects of political processes, mediating opposite demands, and even potentially providing the means to clarify the balance of power and hierarchies.

Therefore, a high research interest in the analysis of cooperation between activity systems can be noted (Engeström & Sannino, 2010).

Primarily, the focus is on the common object, the shared object and/or the boundary object -- such as in analyzing networks (Lompscher, 2004; Kerusuo, 2006). The special benefit of the concept of boundary objects is that it aims to explain cooperative relations and elements between individuals, groups, etc. (Schaal, 2009). Flynn *et al.* (2015, p. 1) examine the so-called "industry-school partnerships" and notice the challenges of establishing those partnerships, as each partner of the cooperation has its own aims

and frames of reference (e.g., an educational reference frame versus business reference frame).

This investigation will use Mercedes-Benz plants as a case study for examining the establishment and development of dual training structures.

3. Methodology

A major advantage of case studies is that they can draw on multiple sources of evidence which leads to a greater extent of detail available for each case (Rowley, 2002). In this way, case studies and case comparisons are suitable for investigating complex or unknown phenomena (Geithner, 2012).

For this case study, the authors chose the automotive industry as it is a traditional production sector whose various organizations can be reasonably compared across the world. Of course, standards may be different in South Africa, the USA and Germany, but cars produced in all of the plants are branded with the Mercedes-Benz star which represents a high level of quality. So both, the aspect of tradition in the dual apprenticeship system in Germany and the fact that the automotive industry is a global player led to the choice of Mercedes-Benz.

The data collection and research design contain the following elements:

Tuscaloosa, USA (MBUSI):

- Document analysis (articles in the newspaper “Tuscaloosa News”; documentation from the factory itself, e.g. DaimlerChrysler, 1999);
- interviews (with (1) a trainer from Bremen, Germany, who was responsible for the
- implementation of a dual training system in the USA; (2) U.S. trainers who instruct on site at the plant in Tuscaloosa; and (3) course leaders in the college in Tuscaloosa; conducted in spring 2015); and
- site visits to the plant (spring 2015).

East London, South Africa (MBSA):

- Document analysis (articles in the newspaper “Daily Dispatch”; research articles on the South African Automotive Sector, e.g. Bronkhorst *et al.*, 2013); and
- interviews (with (1) a trainer from Bremen, Germany, who is at MBSA as an expatriate from 09/2015 until 09/2017; (2) South African HR managers; (3) trainers from the Mercedes Benz Learning Academy in East London; April 2016); and
- site visits to the plant (April 2016).

All interviews were (and will be) recorded, transcribed and analysed.

4. Results

The following questions will be answered in this article, with conclusions deduced from empirical results:

- What do we learn about educational transfer in the context of Tuscaloosa (U.S.) and East London (South Africa)?
- How are cultural and cooperation problems observable and how are solutions to those problems developed?
- What role do boundary objects play in the implementation of dual training structures in foreign plants in the case of Mercedes-Benz? Can the boundary objects be identified?

As this research is part of a project on skill formation at the shop floor level, reporting all of the explored issues would go beyond the scope of this article. Thus, the authors decided to concentrate on several aspects to answer the mentioned questions (see chapter 5: Analysis).

4.1. MBSA (Mercedes Benz South Africa)

The role of skills development in South Africa extends back to the late nineteenth century – specifically the period between the beginning of industrialization and World War I. Skills of white immigrants built the basis of craft skills during the early industrialization period, and the substantial influx of immigrants had a “serious distorting effect on official attitudes to skills formation” (McGrath, 2004, p. 12). Hence, not enough attention has been paid to the role of autonomous skills formation. Besides, the white artisanal training that did develop had a strong connection to social programs that focused on the poor and the delinquent. Additionally, an important topic characterizing South Africa during this time was skin color. Semi-skilled labor should have been protected against undercutting cheaper black labor. Moreover, racist views were promoted constraining skills development for blacks. While coloreds had some more opportunities for skills development, the white community simply wanted to provide blacks only the very basic abilities for surviving in the rural areas (McGrath, 2004). Not only was the notion of skill racialized, but it was also gendered. Thus, South Africa has faced a polarized, racialized and gendered system of skills ever since the early nineteenth century.

Mercedes began its production in South Africa within the scope of the Car Distributors Assembly (CDA)¹, which has been in East London since 1948. Since 1958, parts of the limousines W120, W121 and W180 have been assembled there. 1962 marked the beginning of truck production at the plant. Mercedes-Benz passenger car engines were made out of Germany for at first, with the production of engines beginning in East London at CDA in 1973. That same year, the first C-class was assembled in East London and the first women worked on the assembly line. Mercedes has quite long tradition of building cars in South Africa. Some authors state East London to be the most complex facility outside Germany as it has produced extremely demanding niche vehicles (e.g., the S-class) and passenger cars for other manufacturers (e.g., Honda and Mitsubishi) (Lorentzen, 2007).

¹ CDA Ltd officially opens its doors to assemble various brands, including Nash, Fiat, Renault, Land Rover, Hino Briska, Prince Miller and Commer in 1950. In 1984, Daimler-Benz acquired 50,1 % of shares of CDA and the name was changed to Mercedes-Benz of South Africa Ltd. Retrieved from www.mercedes-benzsa.co.za/history.

This required a really high competence level. To come back to international markets and to export trade after apartheid times in the 1990s,² the Motor Industry Development Programme (MIDP) granted benefits to the automotive industry (e.g., forgoing of import tariff revenues).

In 1981, the first local skills and artisans training center, Mercedes-Benz Technical Training Centre, was established as a non-racial institution within the industry. Since this time, the apprenticeship “millwright”³ has been trained on the Mercedes site in East London. According to Lorentzen (2007, p. 170), “without investing in these shop-floor skills, it would have been impossible to master the plant’s complexity.” This was also mentioned in the interviews by current trainers. Millwright is accredited by the Qualification Council for Trades and Occupations (QCTO) and follows a national curriculum. The apprenticeship takes 3-4 years and the trainees learn in the workplace. Trainees have regular school times, but do not attend college or high school. The theoretical parts of the curriculum are taught by teachers in the Mercedes Benz Learning Academy⁴ who are qualified as trade test officers. Examinations are developed by MerSETA (Manufacturing, Engineering, and Related Services - Sector Education and Training Authority), and assessed by the trade test officers in the QCTO-accredited trade test center. Most of the practical training parts are conducted by a full-time trainer coming from the production, maintenance and/or specialist areas in the plant. Around 25 apprentices – “appies” how they are called at Mercedes – participate in the program each year. The system of the apprenticeship is dual in that trainees undergo both workplace learning and the school place learning, although both components are in-house.

In addition to the apprenticeship Mercedes offers a new way of achieving qualification that has been in effect since August 2014: The Shop Floor Skills Center has been established in a cooperation with the National Treasury and the Jobs Fund. In a two-month training, young people are taught basic knowledge for production work at the shop floor level. 48 adolescents are in each cohort, starting every two months. The objective from the National Treasury is to bring 500 people through the program within two years. It was Mercedes’ initiative to start the program; it is not only set up to train according to their own requirements of skilled labor, but also to provide qualified young people for suppliers. The South African government supports these Mercedes’ training programs as they potentially provide positive effects on the labor market. East London currently has a youth unemployment rate of more than 60 %⁵.

According to the Mercedes HR department, trainees from the Skills Center are qualified to work on the assembly line while apprentices are trained to work in maintenance and as specialists. The motivation to create a second, much shorter and more shallowed training program came from Mercedes’ internal need for qualified workers on the assembly line, but also from the external need to structure the labor market. Ever since, Mercedes has had the problem of human capital loss to more structurally stronger areas like Port Elizabeth, Johannesburg, Pretoria or Cape Town as people cannot “warm to the cultural backwater of East London [and] hence, [the higher qualified employees] typically leave after two or three years and join other assemblers.” (Lorentzen, 2007, p. 170). Having a

2 From the 1980s until 1994, South Africa’s automotive industry was isolated due to apartheid-sanctions internationally (Bronkhorst *et al.*, 2013).

3 Alternative titles used by the industry which might sound more familiar to a European reader are Electro Mechanic or Machine Tool Millwright (QCTO, 2015, Qualification Number 671202000).

4 The Mercedes-Benz Technical Training Center was re-named in Mercedes Benz Learning Academy in 2016.

5 See <http://www.statssa.gov.za/publications/P0211/P02114thQuarter2015.pdf> (retrieved 25.04.2016).

high number of qualified throughputs increases both, the general education level and the chances of employees staying in East London.

4.2. MBUSI (Mercedes-Benz U.S. International)

The weak dollar in 1989 was responsible for making exports to the United States unattractive. In the beginning of the 1990's, Mercedes decided to build a new plant in the USA. Surprisingly, Mercedes' decision chose Tuscaloosa, Alabama for their new production site. In the past, cotton and crop cultivation were the main industries in Alabama and industrial production was not very popular. Thus, trade union associations were barely present and wage costs were low. At the same time, there was a large number of potential (unqualified) employees. The strong interest of local stakeholders influenced Mercedes' decision: "They wanted to be our partners. Alabama would rise or fall with Mercedes-Benz." (Paulmeno, Public Relations, Mercedes, cited in Haasen, 1999, p. 76). "Significant state incentives" (Apfelthaler *et al.*, 2002, p. 109) also encouraged Mercedes' decision to choose a southern state.

In 1997, the factory in Tuscaloosa began production. To qualify employees, Mercedes implemented an exchange of knowledge: 160 American employees were sent to the Mercedes production plant in Sindelfingen, Germany in order to learn the skills they would need to take up the role of Trainer in the work process upon their return. Another 80 skilled workers from Germany were sent to the U.S. to work as trainers in order to support these multipliers in the work process.

Afterwards, rather informal training structures have been established. For example *training places near the line* or *training teams in the work process* (consisting of six team members, led by a team leader). The success of these training structures has proved successful for Mercedes in at least one way: the M-class was a bestseller. However, the quality was not regarded to be as prestigious as other Mercedes cars. Driven by the Mercedes' success, Honda (1999), Toyota (2001) and Hyundai (2002) opened factories in the southern states, all within a 130 miles radius of the Mercedes plant in Tuscaloosa. This led to enormous changes in the labor market and to the need for loyal employees in order to circumvent potential poaching.

The first attempt to implement dual apprenticeship structures started in 2003 when Mercedes decided to implement the *West Alabama Apprenticeship Program* from 2005. For apprentices, this meant attending high school full-time and working in the plant every working day for the duration of three years (Wortham, 2003). Though this approach is obviously "dual", it lacks essential elements for success, such as an elaborate curriculum, appropriate trainers at the workplace, and integrity of objectives. The results of this early apprenticeship program are not communicated in details by Mercedes representatives. In the interview, the only statement on this was: "Yes, we had some apprenticeship structures already before." (Wayne Smith, HR MBUSI)

By 2005, the factory and number of employees were largely extended; also, the production of the new M-class series as well as the new SUVs (R-class and GL-class) became more complex. Moreover, in 2009 Mercedes decided to produce all C-class cars for the North American market in Tuscaloosa. The need for skilled labor increased.

A German CEO ensured that beginning in 2011, two expatriates from Germany started to develop dual training structures at MBUSI and were supported by a former production employee. A college acted as the educational cooperation partner for the training program. An alternative option would have been to choose a high school, as

it is the practice in the German dual system, but these have a poor reputation and are usually not very specific in knowledge transfer but rather in orientating. Students taking part are awarded degrees that are regularly accepted (e.g., associate degrees and short-term degrees) in North America. The curriculum was developed by MBUSI and the college; accreditation of the courses was subject to the supervision of the Alabama Department of Postsecondary Education. Two training courses were conceptualized: The Mercedes-Benz Automotive Technician Program (length: 15 months) and the Industrial Mechatronics Program (length: 27 months). The structures and contents of both courses follow an existing standard on the one hand, and are organized according to the wishes of MBUSI on the other hand. MBUSI created a financial support and incentive system to promote participation: 65 % of the college tuition fees for the Mercedes-Benz Automotive Program are paid by Mercedes. In the second and third terms, Mercedes pays either 100 % of tuition fees if good grades are achieved or 50 % of tuition fees for poor grades. Likewise, MBUSI initially pays 65 % of the tuition fees for the Industrial Mechatronics Program. In the second term, compensation is either 70 % or 35 % and in the third term, it is either 80 % or 40 %. From the fourth to seventh terms, MBUSI pays either 100 % or 50 % of tuition fees depending on the grades achieved. Moreover, trainees are able to earn an additional income while working in the factory on non-college working days. It is intended that formal learning phases are also carried out in the factory, including at the MBUSI training centre.

A third course has been established for the more technically demanding work such as maintenance and service work of robots: Mercedes-Benz Industrial Mechatronics Maintenance Program (18 months, without cooperation of a college). It is designed as a further training for students who have completed the Industrial Mechatronics course. Apprentices participating in the Industrial Mechatronics Maintenance Program receive a regular employment contract as well as regular payment.

5. Analysis

Within both cases, MBSA and MBUSI, the following elements characterize the brief outlines of both programs and developments (see table 1):

- Path dependency,
- Organizational learning
- Innovation.

Table 1: Path dependency, organizational learning and innovation.

	Path Dependency	Organizational Learning	Innovation
MBSA	Skilled labor coming from immigration; racial problems and Apartheid; Production starts with CDA	Apprenticeship since more than 30 years; need to overcome structural problems and need to qualify employees	Shop Floor Skills Center since 2014 to train young people for the assembly line
MBUSI	Cotton and Crop cultivation; Low wage costs; high number of unskilled available labor	Training on the job; first dual structures; need to qualify employees	Establishment of dual apprenticeship structures in cooperation with a college

In the following, for each part of table 1, exemplary boundary objects are being assigned.

5.1. Boundary objects

In table 2, we inserted keywords of boundary objects which have been identified during the analysis of the collected data. In the following, they will be described in more detail. The categories were inspired by Gonon’s (2014, p. 244) criteria which have to be met if “dual models are to be successful”.

Table 2: *Boundary Objects.*

	Path Dependency	Organizational Learning	Innovation
MBSA	Governance structures (Coincident Boundaries)	Codified Knowledge (Standardized Forms)	Vocational Training as a career relevant model (Ideal Types)
MBUSI	Financing Sources (Repositories)	Willingness of the company to train in a dual way (Ideal Types)	Integration of Schools (Coincident Boundaries)

5.1.1 Path dependency

At MBSA, the governance structure of the MIDP is an example of a coincident boundary. The financial support of the National Treasury is a governance item that supported Mercedes’ idea to further develop their qualification system. Coincident boundaries as governance structures are characterized by the interesting background that both Mercedes on the one hand and the state on the other hand pursue an aim (Mercedes: profit maximization with skilled personnel; state: minimization of unemployment) that overlaps with the aim of the other.

For MBUSI, financing sources *inter alia* played a decisive role in building the plant in Tuscaloosa. As this decision was a complex process, the financial matters are a good example of a repository.

5.1.2. Organizational learning

Each form of training requires structures to help trainees and trainers achieve their objectives. Within MBSA, codified knowledge is an important part of the training, as the curricula is highly modularized and unitized. For example, MBSA training programs utilize standardized forms in their overall didactical approach and in their examinations.

At MBUSI, the willingness of training employees seems like the biggest milestone. As this willingness is a rather abstract, top-heavy process, the boundary object known as an “ideal type” describes willingness in an appropriate way. The ideal type uses other boundary objects to become more concrete. In this case, the “knowledge from Germany” in form the of expatriates is a jointly used resource.

5.1.3. Innovation

Though VET has been regarded as a career relevant model in the South African Mercedes plant for several decades, the dual training structures reflect an important

innovation. Their successful implementation and operation demonstrate the quality of this innovation. The most recent achievement in dual training programs is the short-term qualification for the workers at the assembly line. These differentiated development is a vivid example for ideal types.

MBUSI chose the path of cooperation with a college to implement dual structures. The coincident boundary shows again that different partners (MBUSI and the college) share a “lowest common denominator”: MBUSI outsources the theoretical training parts of its apprenticeship program to the college and the college has a well-known industry partner with a very good reputation.

5.2. Activity theoretical conclusion

The different types of boundary objects demonstrate a high variety of development steps. It is important to note that the innovative aspects in the implementation of training structures of German plants abroad cannot be evaluated without taking path dependency and organizational learning into account. Therefore, activity systems cannot be investigated without taking the aspects of path dependency and organizational learning into consideration. Figure 2 is a graphic of this finding that represents activity systems using theoretical triangles.

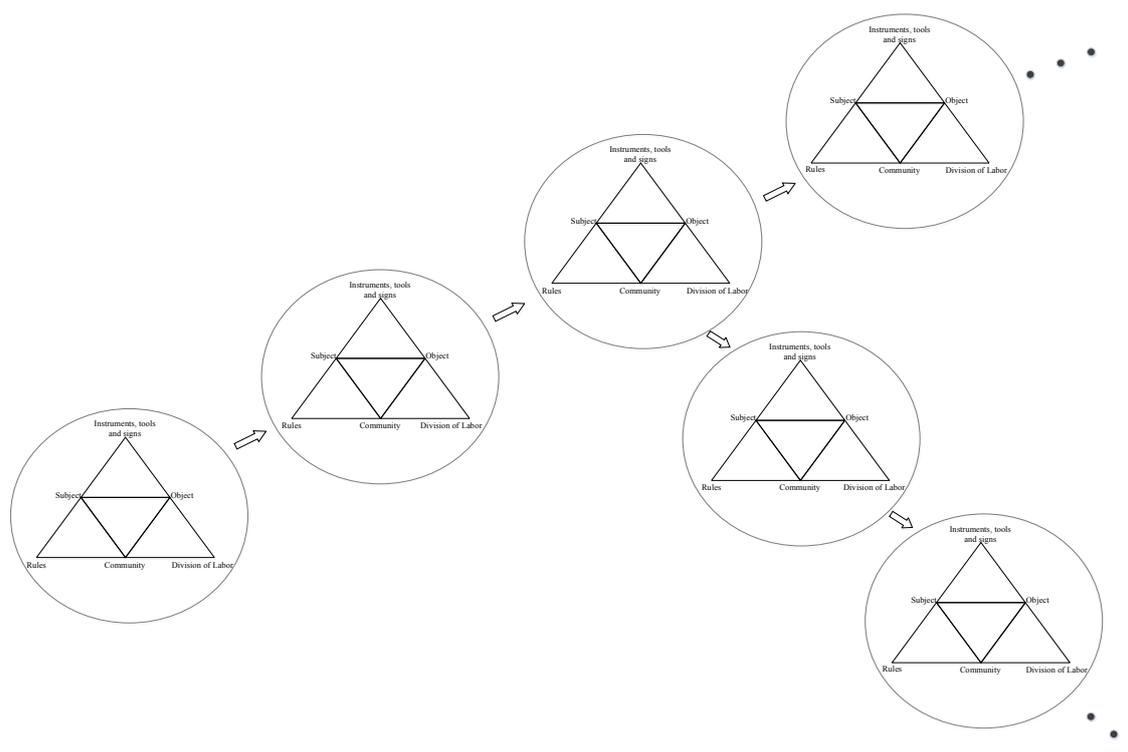


Figure 2: Path dependency in activity systems.

6. Conclusion and suggestions for further research

This research has explored how the German MNC Mercedes-Benz uses dual apprenticeship structures in its plants abroad and what way these are implemented and further developed. Boundary objects have been identified within these programs – leading to the conclusion of activity theoretical nature outlining the importance of holistic research strategies.

The cases of MBSA and MBUSI show quite different approaches, but, are overlap as well. There was neither an apparent, direct 1:1-transfer of dual training systems, nor a simple adaption. A “grown-inside” system resulting from organizational learning can be called an innovation, especially compared to the initial vocational education and training systems in the U.S. and in South Africa. In further research, actual VET systems should be taken into account and factors such as the production system, recruiting system and quality assurance system should be discussed. Though somewhat implied already by path dependency, cultural aspects should be considered more deeply in future research as well.

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