Past meets Present – the history of the German Vocational education and training model as a reflection frame to the prospect of the Egyptian model

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Abstract: The background of the considerations presented here is the longer time experience to transfer German practice of vocational education and training (VET) to Egypt at various levels, and to work with Egyptian colleagues. Not only Egypt was the country of reflection, experiences with and observations in some other emerging and developing countries gave the background. The observations sharpened the eye for the particularities of the own German vocational education and training. For these reasons, the next sections attempt to combine two heterogeneous perspectives. The view on vocational training in Egypt and the view of the historical development of vocational education and training in Germany are linked in order to formulate and discuss potential possibilities for the further development of Egyptian vocational education and training. It can be assumed that the look back to our history can provide us with more generalized knowledge of how a society can solve the problem, the reproduction of the social workforce for the demands of social development, and how the associated social process is designed. And we have learned that a look into the history of the German VET were very often more fruitful than a look to the present of the current German system with its high complexity and with the huge difficulties to transfer its governance to foreign countries' social environments.

Keywords: Egypt, Germany; Policy transfer in VET; History, international cooperation;

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1 Introduction

The background of the considerations presented here is the longer time experience to transfer German practice of vocational education and training (VET) to Egypt at various levels, and to work with Egyptian colleagues. Not only Egypt was the country of reflection, experiences with and observations in some other emerging and developing countries gave the background. The observations sharpened the eye for the particularities of the own German vocational education and training.

At the same time, they have also stimulated a discussion to explore the possibilities of learning from German experiences - with all the specificities and differences - for the further advancement of developing countries' vocational education and training. And we have learned that a look into the history of the German VET were very often more fruitful than a look to the present of the current German system with its high complexity and with the huge difficulties to transfer its governance to foreign countries' social environments.

During this cooperation with Egypt, there were often unexpected moments which reminded one of the historical special feature of the German development of vocational education and training, such as the dignified appearance of a production supervisor and in-company instructor in a textile factory, dressed in a traditional

garment (Galabiyah), instructing the young "trainees" in the skills of textile production. It exemplifies the strong role of traditional patterns of vocational training in modern enterprises. Or the walks through a quarter of the dealers of used automotive spare parts with their integrated workshops, clearly showing the dualistic economic order between traditional and modern sectors (see Lutz, 1984). These observations, which caused uncertainties in a first impression, have led to the following considerations, and stimulated the reflection of how to share experiences and knowledges from the German VET notwithstanding of the deep differences of conditions, backgrounds and socio-economic and cultural environment to other developing and emerging countries to benefit.

But Egypt remains the main reference country for the here given conclusions due to the deep experiences and reflections during a three year R&D project with the construction industry in the country and the additional possibilities to observe social practices of VET in Egypt, and the frequent occasion to conduct interviews and expert talk within that part of the Egyptian society.

For these reasons, the next sections attempt to combine two heterogeneous perspectives. The view on vocational training in Egypt and the view of the historical development of vocational education and training in Germany are linked in order to formulate and discuss potential possibilities for the further development of Egyptian vocational education and training.

However, the range of the perspectives are necessarily limited. The focus of the historical study of vocational education and training concentrates on the development of industrialized vocational training during the proto-phase of the dual vocational training in Germany during the Prussian-German imperial empire. The focus is limited to the German industrial development because of the Egyptian background with greater attention to share German experiences to the Egyptian private industrial sectors. If we would address less industrialized countries e.g. Rwanda or other countries in Sub-Sahara Africa we should limit our focus more on the preparatory phase of German industrialisation from the beginning of the 19th century with the different activities of *Gewerbeförderung* (Promotion of Crafts and Industry) in e.g. Prussia, Baden and Württemberg.

It can be assumed that the look back to our history can provide us with more generalized knowledge of how a society can solve the problem, the reproduction of the social workforce for the demands of social development, and how the associated social process is designed. The academic organized reproduction of the workforce is ignored here.

2 Theoretical backgrounds

2.1 Epistemological considerations

At this first point, a more epistemological background of the author two theoretical points are to illustrate a bit more: (1) the general cultural studies research perspective is here now applied, which takes a basic assumption of contingency for the development of social processes. In this way, the developmental ambition angled towards rationality at the "endpoint of the path of modernization theories" is no longer in the modernist theory, but preferably the interrelationships between tradition and modernity, as well as the "very specific historical-cultural contexts in which seemingly necessary modern structural decisions take their contingent beginnings, as well as the alternative codes and practices of the present and past, which demonstrate the existence of >multiple modernities<" (Reckwitz, 2011, pp.9, 14, Transl. StW). (2) Additionally and specifically because we are in the arena of development politics we use an epistemic background of a postcolonial theoretical assumption of e.g. R. Grosfoguel, who express the need to overcome the dichotomies between the Eurocentrism and third world fundamentalism, to go beyond the colonial order and the postcolonial certainties, "(…) to progress beyond economic reductionism and culturalism (and how) can we overcome the eurocentric modernity without throwing away the best of modernity as many third world fundamentalists do?" (Grosfoguel, 2009, p. 10) With respect to the postcolonial theory we have to leave our position of better knowing and supremacy of the "western best" encountering experts from developing and emerging countries and move to a position of dialogue and respect

and mutual sharing of experiences of each specific VET regulation and characteristic. Not easy to do so but the only way to succeed in a long term perspective.

But away from the theoretical background back to the theoretical foreground of theories applied for the research of VET systems and its characteristics.

2.2 The typology of the different VET models

Taking into account notes of W.-D. GREINERT to an analysis model by C. Offe (1975) on the study of the historical development of vocational training institutions, it can be said that vocational training institutions are concerned with the specific characteristics of "instruments for overcoming social problems" (Greinert, 2015, p. 4). Precisely, it is about the social problem of the necessary qualification for industrial production. Germany's rising industrial society in the nineteenth century, especially towards the end of this century has been faced to a more important extent with these qualification problems (Rinneberg, 1985).

It would be a clear misunderstanding, the work of W.-D. Greinert only assigns a structure-functionalist view to the formation of vocational training institutions, although this may seem plausible on the basis of a first, superficial view of his approach to the explanation of the governance mechanisms of vocational training institutions. The comparative view of the various vocational training systems in the world clearly shows that the old industrialized countries have produced very different solutions which cannot be explained by a structural-functional model of action.

W.-D. Greinert reduced in his contribution, which follows the concept of ideal types by Max Weber, the real diversity of the manifestations of vocational education and training to three basic governance concepts and thus ideal types.
Whereby the concept of governance is meant that the question of "how do the communication partner in the social system of action *vocational education and training* complying with regulations and accepting the same interpretive patterns of their actions?" (Greinert, 1995, p. 31, accentuation in the original, Transl. StW) can be answered by recourse to regulatory patterns.

In the regulatory pattern of the basic type of *tradition*, "traditional, customary legitimate action" determines vocational training, the basic type of the *market*, vocational training “is determined directly by the production factor and by the qualification signals of the labor market", and finally, in the basic type of *bureaucracy*, vocational education and training is regulated "on the basis of legal regulations by the state or the state bureaucracy alone."(All quotations from ibid., p. 32, Transl. StW.). To a clear understanding the explanation of regulatory patterns to govern vocational education and training and the simplifying of three ideal types of the classical European VET governance are analytical tools and not a description of the existing reality of vocational education and training. The French Alternance or the German Dual Vocational Training are mixed forms or can be classified as real types in the sketched concept of Greinert. It must also be emphasized here that the real nature of vocational training systems always occurs in mixed forms, especially for developing countries and emerging countries, but also for classical industrialized countries. In Germany, in addition to the dominant dual training area, there is a fully-schooled training area, e.g. for the expanding economic sector of nursing or care work.

Other, different concepts of the simplification and typologies of vocational education and training systems are discussed alongside the German vocational pedagogy debate, especially in English-language publications of comparative political science (more see, GONON 2013). We have to note especially on a very prominent typology from the comparative political economy. This concept could enlighten the different possibilities of businesses to be involved in VET provision and the relation with the public sector in initial qualification for work and employment (more details see Busemeyer, 2013).

2.3 The analytical concept of the historical institutionalism

As well to escape a reduced structural-functionalist view of the vocational education and training regulation but additionally to open the perspectives, the theoretical concept of the historical institutionalism of the comparative political sciences is used here (see Thelen, 1999; Busemeyer & Trampusch, 2011; Busemeyer & Trampusch,

2012; Schimank, 2007). This concept assumes that the development of VET institutions, their stability and change are dependent on long-term processes, the consequences of which are often only apparent from a historical perspective. Their functionality cannot be derived from their current social and functional significance, but only from the historical process. The development of new vocational education and training structures depends on specific, historical settings based on opportunities, actors' constellations and feedback loops of the political process (see Thelen, 1999). The change, triggered by the necessity of institutional orders to adapt to changed social and political conditions, often does not take place in revolutionary upheaval. In fact, it put into effect in small steps, the changes develop only in the long run (see Busemeyer, 2014), especially when there are many social actors involved in the forms of the institutional order.

In the final chapter the findings from a historical perspective of the German VET development are mirrored on the very different order of vocational training in Egypt. The analytical components of the historical institutionalism frame the mirror and we could see some Egyptian specificities with potential better performance of countries' VET. This is connected with the hope, with all restraint, that the knowledge of the historical development of one can help and the other to change their own present and to find shaping options.

Before going deeper into the history of the starting phase of German industrial vocational education and training model, however, the present situation of Egyptian vocational education and training, including its frameworks and conditions, will have depicted. At the end, both perspectives are reunited and with an outlook forward to the future shaping of the Egyptian VET system we will finalize.

3 The structure of the vocational education and training system in Egypt

Egypt, the most populous country in the Arab world – today's population is about 92 million inhabitants with an estimation to reach the 100 million in the beginning 2020th years, is endowed with many resources. The important national economy, whose second-largest trading partner 10 years ago was still Germany - in 2012, still only fifth place - has long been in the focus of German federal foreign policy. In 2016 the trade volume between the two countries increases back to the position of the beginning 2000th years when Germany was the second important economic partner worldwide, with an overall trading volume of 5.5 billion Euro.

Already in the 1950s the still young German Federal Republic began the first activities to support the economic and social development of Egypt. Due to the important strategic role of Egypt, other donor nations have also provided many development, economic and military aid funds to Egypt.

3.1 The vocational education and training system of Egypt

Especially the education sector was supported by international development agencies. In Egypt, for example, a highly complex network of public and private educational institutions has developed - from the private primary school through public training institutions of the different ministries to a more or less differentiated system of traditional apprenticeship training. It is also characterized by a great complexity and heterogeneity, which is closely linked to the general education of vocational education and training in Egypt. Traditionally, vocational education and training is more likely to be the pool for the losers of the Egyptian education system, a second or third chance education. There is a tremendous difference in income earning in positions based of academic and non-academic education. But due to the high level of unemployment of academic graduates in Egypt (ETF, 2017), we can find graduates from the different training activities earning much more money than academic graduates but as a mayor constraint of the education system in Egypt the academic graduation is seen as a prerequisite for family formation and will increase the possibilities on the marriage market significantly (see Al Amry, 2008). And with an academic graduation you can reduce your obligatory military service from 36 months to 12 months.

Strict approval rules at different levels of the educational stream limit the further educational path for the Egyptian youth through rigid grading. In this respect, the general education stream enjoys the highest social standing with its end in the university graduation - precisely because it promises exclusively access to the

highest income strata and a secure life perspective even if the reality of most academic graduates is far away from that promises.

At the end of the 8th grade, about half of the pupils leave school and then work in the informal economy. Two-thirds of all pupils who follow the school path visit the technical secondary schools. The rest follows the stream of general secondary schools until its end at the university (see GTZ, 1995; DIFID-WB Collaboration, 2005).

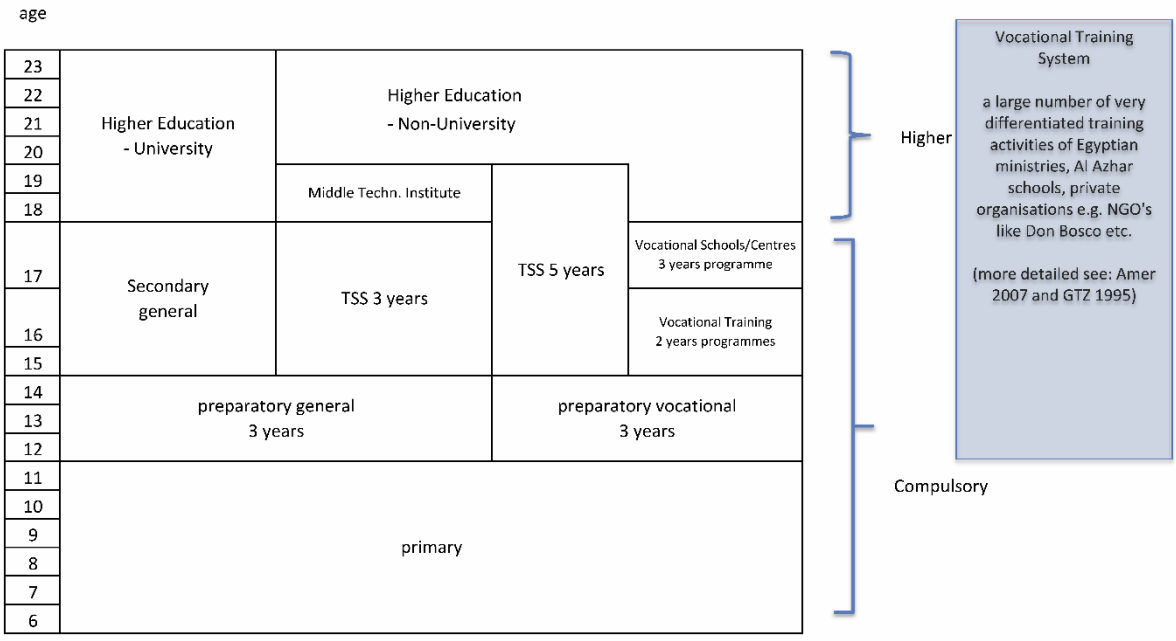

Figure 1: Education System of Egypt, Source: (Wolf & Sobhi, 2016, p. 17)

Each year around seven hundred thousand workers are entering the Egyptian labor market, which can only absorb two hundred thousand workers. Young people and young adults of both sexes between fifteen and twenty-four years are, according to the official figures of the UN statistics office, a quarter without work. The low paid work or the casual work of the young coolies are thus not even recorded in the official statistics. In particular, the graduates of the technical secondary schools are, according to various estimations, 70% without employment (see Antoninis, 2003). A part then changes to the traditional (informal) sector after three or five years of vocational schooling in order to make a "traditional" apprenticeship. Paradoxically, there is also a shortage of qualified workers for industry, as graduates of formal school-based vocational training have hardly any operational qualifications and are not recruited (see Wally, 2012). As we could observe the recruitment in the construction industry follows very traditional rules and regulations and not based on any formal certificates (see (Wolf, 2015, p. 145)

Synoptically to speak about the Egyptian Vocational education and training system we can identify three pillars: (1) the dominant area of public vocational education, determined by technical and vocational secondary schools under the supervision of the Egyptian Ministry of Education, (2) the field of training measures - under the aegis of different ministries - or non-formal under religious or secular responsibility (NGOs) and (3) the area of traditional apprenticeship training in the informal economy (see BARABASCH & WOLF, 2010; SCHNEIDER, 2004; GILL & HEYNEMAN, 2000).

Under a perspective of governance and management of vocational education and training in Egypt, there is a lack of coordination between the different actors of the trainings, no coherent job profiles and occupational standards exist and an absence of a qualification framework and recognized certification systems have one to state. In addition, the absence of qualified formal training institutions combined with a lack of qualified teachers impair the performance of the Egyptian vocational education and training system (see Álvarez-Galván & OECD, 2015; Amer, 2007; Antoninis 2003).

The Mubarak Kohl Initiative - MKI (1994-2007) was an attempt by the Federal Republic of Germany to make a large contribution to the solution of the problems outlined here. The stated goal was to develop a dual system in analogy to industrial training in Germany with a close interlinking of company training and school learning with the corresponding organizational structures. At the outset, it was intended that the entire Egyptian vocational education and training system should be transformed into a dual system from individual pilot measures (see Heitmann, 1994; Schneider, 2004; Schippers, 2009). This has not been achieved. Even after the transfer of the structures to the responsibility of the Egyptian government in 2007, a corresponding global change in Egyptian vocational training remained. Although the number of regional organizational units for the Dual System (RUDS) has risen slightly in the country, the number of annual graduates of the Egyptian Dual System has increased to 27,000 in 2014 under the auspices of the Egyptian government, of which more than 75% are employed after completion (see Adams, 2010). In 2017 the number of trainees in the Egyptian continued activities of MKI-DS increase to 35,000.

3.2 Problems of vocational training and the labor market in Egypt

According to the observations and conversations on the ground there is little to be expected of a widespread, fundamental change in the Egyptian public vocational training or a paradigm shift in occupation relevant training or in-company qualification, which would be covered by industrialists. Meanwhile some larger Egyptian companies are discussing a reorientation of intra-company workforce qualification, especially in the context of expansion plans or product modernization strategies. However, the provision of skilled labor is predominantly delegated to the state, only very few systematic, business-based training with wider recognized labor certificates for the workers is realized (see Hassanein, 2014). In conversation the management often expresses the fear that the investment in training to benefit their new cohorts of qualified laborer would be lost through poaching the laborers and free riding of the competitor. Also, the workers would ask for better payment after successful certification.

In this context, another area of problems is being set up in the area of personnel management and professional recruitment: At present, workers are available at a comparable (low) qualification level in large quantities and are interchangeable. This leads to a competitive situation of the labor force and a self-reinforcing wage dumping. This in turn leads to a fundamental problem of the Egyptian economy, which is largely based on a low-wage sector and the generation of profit margins at a low level of investment, mainly in small and micro enterprises in the informal sector (see Angel-Urdinola & Semlali, 2010; Zelloth & ETF, 2014; Amin, 2014). This virtually excludes access to production, operation and even the development of higher-quality and more modern technologies.

Under these conditions the introduction of sustainable, environmental friendly and future-oriented products and production in the manufacturing sector still appears far away. Egypt seems to remain a low cost producer with bad quality products. Positive changes seem a distant prospect. In the last years under the economic crisis of Egypt induced from the political constraints and conflicts the middle class suffers under the situation. Combined with the demographic challenge of the massive rejuvenation of Egyptian society with both the scarcity of decent work and the lack of future prospect by sufficient education, Egypt seems only an import based goods market for the luxury segment, an expansion of quality goods market lacks of purchasing power.

However, as in the economy, there are mental barriers to the transformation of the labour market in the corporate structures: It is often observed or reported that modern formal regulations and structures play only a subordinate role except in the encounter with the state bureaucracy. According to the observations, this also applies to vocational training in Egypt. There is a mixture of traditional regulatory patterns and modern procedures, which are subject to the rules of rational Western bureaucracies.

In essence, the in-company qualification is based on traditional vocational training. It aims at the training of appropriate behaviours and rules and roles of work, less on professional qualification. This qualification is often carried out by workers who are socially respected in the structure of the workforce or by supervisors or supervisors.

Egypt is based on an old, complex, traditionally shaped society (see Semsek & Stauth, 1987; Didero, 2012). In this, the creation and maintenance of supposedly individually beneficial or socially expected social relationships and networks, as well as the active proof of loyalty towards society's more important ones, are essential for the recognition and social positioning of one's own person and on the other. It builds the traditional basis for social advancement through relationships, but also for emotional dependencies. For instance this tradition, with its principle of emotion-based negotiation of one's own role, competes with the rational and modern design of vocational education and training as a formally defined and codified qualification requirement manifested in training plans or arranged curricula - without any negotiating margin of any kind.

The statement by a head of education in the Egyptian Dual Education System of a modern enterprise illustrates this: "If a young man (in the Egyptian dual system) does not feel comfortable on a machine, I take him away and put him at another workplace where he can learn better, he's supposed to become a good worker. What he cannot learn from this engine, he will learn in a different way ". (From the transcript of the translated group discussion with personnel responsible, 5.3.2015, Cairo).

As so far the short description of the Egyptian vocational training, its basic conditions and problem situations. But now we want to move from the present of Egyptian VET to the history of the German dual training scheme to better understand the conditions of its development, to sharpen our understanding of the origin of the today's institutions and to facilitate by going back to the origin the transfer of experiences and concepts to other countries and its different social environments.

4 History of the early phase of vocational training in Germany

W.-D. GREINERT proposes in his history of vocational training in Germany, a three-tiered diachronic approach (see Greinert, 2015). He divided the beginnings into a proto-phase, which took its starting point around the 1870er years, with historical models far into the middle age. It is followed by a phase of the consolidation of the Dual System of Vocational Training, which is the specific German model of the reproduction of the industrial labour force[10]. This period stretches from the early 1920s to the early 1970s, and with all the difficulty of fix such a caesura, he put it to the end of the reform era of the 1960s and 1970s of the Federal Republic and to the end of classical modernism in the industrialized countries. The current, third phase will be tried by GREINERT with the catchphrases of the epoch-change and the modernity crisis; the institutional order of the qualification for work and employment in Germany is characterized by a heterogenisation of the vocational education and training, accompanied by the erosion of the requisites of its existence.

4.1 The proto-phase of vocational training in Germany

What was the development of the labor market in Germany in the middle of the nineteenth century, and why did it develop further into the specifically German model of industrial apprenticeship training?

Germany was a latecomer to industrialization, a latecomer who, on the other hand, succeeded in the short period of not more than one generation to catch up, partly to overthrow the great industrialized countries of England and France in important parameters of industrialization and industrial output at the end with the attainment the competing western imperialist nations.

The development of vocational training in Germany is closely linked to the industrialization process. RADKAU (2008) speaks of a formative phase of this process. On the basis of the proto-industrialization (see Pfeisinger, 2006, 21ff.), particularly on the basis of the leading sectors in mining or textile production, this took on an intensified pace, starting with the 1870s an unimagined acceleration. The railways, mechanical engineering, electrical engineering and the chemical industry (ibid., P. 128) now came into the process as additional industrial sectors, iron and steel production must also be mentioned.

[10] In the concepts of international comparative education we named it "qualification for work and employment" (German Erwerbsqualifizierung). Berufsbildung is the specific German social regulation of it.

The labor force in the new forms of production recruited, of course, on the basis of the existing labor resources, which can be presupposed as generally known, from the guild organized crafts (Zabeck, 2009).

Although the assumption was often made that the modernization of industrial production did not require any or only very little qualified workforce, because it replaces the manual dexterity that still distinguished the manufactory (Smith, 1776, 10ff) by the machinery and technology characterized by technically processed, small-scale work steps coupled to the machine (Rinneberg, 1985, 23ff.).

The assumption for the industrial production means that these small scale work steps are devoid of any human qualification and dexterity, but similar open to technical rationalization and technological efficiency. This results in a real subjection of human labor to capital as well as under modern machinery (see Marx, 1962, 441ff.). But, on closer inspection, this general mechanism of industrial production is more complex than expected in reality, with unexpected effects on the qualification requirements of factory work.

While at the beginning of the industrialization process there was a close link between qualified work and human workability in Germany (see Ditt, 1979, p. 244), a devaluation process of qualified work capacity can be stated in the phase of accelerated dynamics of industrialization. It is astonishing that this process of the further depreciation of human work capacity has not continued, but that a reorganization of qualified human work capacity has to be established in Germany (see Conze & Engelhardt, 1979; Radkau, 2008; Greinert, 2015).

It should be noted that the findings differ in detail, the more precisely the regions (e.g. Baden: Hasfeld, 1996; Württemberg: Oheimb-Loup, 1994), or the economic sectors (e.g. Rinneberg, 1985) or the gender (see especially Hausen, 1978; Canning, 1992) were observed. This also applies to the finding that there was generally a differentiation and, at the same time, a polarization of the qualification requirements in the developing modern industrial enterprise (see Kern & Schumann, 1984; Rupieper, 1986).

4.2 International comparative perspective - development paths in the USA and Germany

The development of an independent industrial German qualification form is surprising, since no such development took place in other industrialized countries, especially not in the USA, and also in late-industrialized Japan, no industry-specific training structure emerged as it happened in Germany.

An explanation which is intended to approximate these manifest differences in the organization of the social reproduction of the qualified work capacity could be inspired by two things: on the one hand, an understanding that goes back to K. (Polanyi, 1978)), that everything that "we call »economy«[development, and thus also indirectly qualification for work and employment, additional remark StW.], is always the result of the interaction between state action, the respective familiar institutions and considerations of individual entrepreneurs."[11] (Biernacki, 2000, p. 111) and on the other hand, an inspiration coming from an international comparative view, which makes it clearer which interaction of the mechanisms of action caused the formation of specific orders of the qualification for work and employment (see Thelen, 2004).

Thus the comparison shows two very different results in the development of specific solutions for the skill problem in industrial production between the USA and Germany, despite very similar problem situations (see, in particular, Hansen, 1997).

Thus, the US companies tended to cope with the existing demand for professional qualifications for their industrial production through minimization strategies. This meant that the companies developed production and developed production technologies that reduced the demand for skilled labor. Here, the keywords are F.W. Taylor and the Scientific Management. This approach was supported by the seemingly unrestricted sales market, the almost inexhaustible natural resources of the North American continent, which favored such a concept of uniform mass production. The institutional orders of the labor force support this solution by the

[11] The German original text: „ (…) was wir »Wirtschaft« nennen, stets das Ergebnis des Zusammenspiels von staatlichem Handeln, den jeweiligen familiären Institutionen und Erwägungen individueller Unternehmer ist."

absence of urban crafts traditions - "(...) important to American training outcomes as the absence of an urban crafts tradition, organized by guilds" (ibid., p. 213).

The massive immigration to the US was an essential moment, and prevented a stable manifestation of socialization in work with its expression of specific work related behaviors e.g. the European tradition of moral economy of the labor force (Thompson, 1971; Griessinger, 1981) through various barriers. The development of training traditions was also made more difficult, since they are linked to common social and cultural ties (see Hansen, 1997, p. 214). Thus for the qualification issues only the recourse to the possible efficiency of the qualification development for the industrial process, resulting from informal learning in the process of work, which was structured according to "the pattern of the interactive stratification of experience" (Harney, 1990, p. 102)[12] and simply the technological solution of machinery use and work organization.

The US-American approaches are in contrast to those who finally used German industrial companies. The German companies were able to make use of an existing qualification concept, namely, the craft apprenticeship (Hansen, 1997, 212ff.). In spite of various attempts, especially in the industrial sector of the basic material production, such as chemistry, iron and steel, as well as mining, until the end of the 19th century to recapture only of semi-skilled training processes and to accelerate the dequalification of labor activity (Rinneberg, 1985), these concepts could not be achieved. The existing training concept of crafts have been transformed, modified and adapted to the needs of the industry (see Harney, 1990; Greinert, 2015).

The reasons for this were: The sales markets in Germany were considerably smaller, the production was geared to a differentiated and local demand. In addition, the companies, especially those in the lead industries of mechanical engineering and the electrical industry, were much more reliant on qualified and skilled labour (Facharbeit) than their US counterparts, who had the abovementioned strong strategies of replacing qualified labor. The German companies had to respond more strongly to customer requirements, the average company size was considerably lower. The industrialization efforts for instance in the south-west of Germany, but also to some extent in the Prussian north of the industrializations zones were heavily influenced by the small trades, traditional crafts and the so called industry landscape (Gewerbelandschaft), more than by the newly establish heavy industry areas in remote locations with sufficient supply of primary goods such as wood, hard coal or iron ore which recruited mostly unskilled workers.

In particular, the mechanical engineering companies were made up of small-scale enterprises, which were handcrafted, but were then transformed into large-scale enterprises through internal growth (see Hansen, 1997, p. 234; Rupieper, 1986; Ditt, 1979; Kocka, 1969). In the phase of high industrialization and rapid growth, they recruited mainly unskilled workers, the necessary skilled workers were hired from the crafts. These skilled craftsmen, according to the statements of many engineering companies from the time, were, however, only limited able to cope with modern production in mechanical engineering with standardized replacement parts and serial production. The efforts, similar to those in the USA, to solve the qualification problem through technology and production organization, have also been very well tried (see Rinneberg, 1985; Homburg, 1978; Radkau, 2008; Homburg, 2010), but for the above reasons of other conditions and on other occasions - which made other solutions possible - were not implemented in the broad range.

"The »German production regimes«, as it is still a tradition today, emerged in the late 19th century, based on an experienced skilled workforce, diversified quality production, forms of internal co-determination, regional »economic clusters« - cooperation of autonomous companies to avoid high transaction costs, and cartel agreements that allowed longer-term planning" (Radkau, 2008, p. 18).[13]

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[12] The German original text: „(…) dem Muster der interaktiven Erfahrungsaufschichtung“

[13] The German original: „Das »deutsche Produktionsregime«, so wie es als Tradition heute noch wirksam ist, bildete sich im späten 19.Jahrhundert heraus, beruhend auf einem erfahrenen Facharbeiterstamm, diversifizierter Qualitätsproduktion, Formen innerbetrieblicher Mitbestimmung, regionalen »Clustern« – Kooperation autonomer Unternehmen unter Vermeidung hoher Transaktionskosten – und Kartellabsprachen, die eine längerfristige Planung ermöglichten.“

4.3 The development of German vocational training under the perspective of historical institutionalism

In contrast to functional attitude to the transformation of institutions of the qualification for work and employment, the approach of historical institutionalism does not assume that the form of today's regulations can make relevant statements about the motivation of their formation and their change over time, but only the historical perspective is permissible. This perspective assumes that the actors, processes and the historically existing institutions are to be analyzed from their own situation, arranged in history, and not from the perspective of a retroactive legitimacy due to their contemporary functionality.

Thus, the historical view shows that the contemporary German characteristics of self-management and co-determination of the social partners, with moderate supervision of the state in the development phase of German vocational training didn't exist. Nor was there any clear interest on the part of the industry in today's specific vocational training, nor any observable positive articulation of the social democrat or the trade unions connected with it (see Thelen, 2003, 7f.). The origin and change of these characteristics of the qualification for work and employment depend on various factors, as the historical institutionalism shows us.

(1) By "favoring obstacles"[14] (Streeck, 2004, cited in Busemeyer & Trampusch, 2011, p. 425) the process is directed to a certain direction. These include the influence of trade unions, the activities of business associations, the existence of chambers of industry and crafts etc.

For a new formulation of existing forms of qualifications for work and employment, critical transposal points, so-called critical junctures (for the concept, see Capoccia & Kelemen, 2007) are a prerequisite. Only if the existing regulations no longer work satisfactorily because, e.g. in the German industrialization process, the legal foundations of the craft apprenticeship changed drastically, by the introduction of freedom of trade and the long time stable qualification mechanism of the crafts wrecked. Thus the recruitment patterns for workers also modified, and then changes can be initiated (see Greinert, 2015; Hansen, 1997; Rinneberg, 1985)

(2) At the same time, however, there must also be appropriate groups of social actors with political and social power who can formulate this failure of the previous order and articulate their interests or that group could emerge out of the change process.

(3) In the process of change, feedback effects are applied to the further process cycle. These can arise from decisions already made, but they can also be fed from alleged traditions (see Hobsbawm & Ranger, 2003), as the narrative of the particular role and quality of medieval craftsmanship, which in the industrialization phase Germany formed such an "invented tradition". Or they arise from organizational constellations, as they evolved in the industry landscapes in southwest Germany.

Critical transposal points can be found with the introduction of the Craft Protection Act of 1897 by the German Reichstag, which was based on a backward-looking qualification model, which was preferred for political reasons to stabilize an economically and socially restored middle class (the process for the establishment of the Craft Protection Act at Greinert, 2015, 23ff., see also Meskill, 2013).

This massive appreciation of the craft in training and qualification questions had unexpected side effects and brought new, unexpected but additional actors into the arena. The establishment of a training system under the control of the craft industry has hindered trade unions from organizing their members along occupational activities, taking the opportunity to influence the training process and control the labor market (see Thelen, 2003). In England, trade unions have taken this path of controlling the training and labor market. They have developed a closed-shop policy (see Finegold & Soskice, 1988, also Deißinger, 1994) and, unlike Germany, blocked the way to an industry-wide mass qualification for the working class (for a deeper inside to the role of unions and qualification politics see, Wolf, 2017).

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[14] German original: „begünstigende Hemmnisse",it means in a dialcetical sense opportunities to develop by societal constraints and restrictions

With this German side-effect, induced the growing interest of the social-democratic trade unions in the period after the Craft Protection Act. The unions perceived with increasing interest the progressive growth of training and qualification activities in industry and mining industry. Many of the members of the German unions came from former craft trades or skilled industrial workers with a biographical openness to training, education and upbringing activities (see Schönhoven, 1979; Engelhardt, 1979; Dittrich, 1980).

A certain climax in this mechanism of inclusion of unexpected social actors can be seen when the Stinnes-Legien-Agreement of 1918 constituted the German trade union movement and the industry associations a joint cooperation agreement of co-determination, which also influenced the industrial vocational training through the industrial work councils which have since then a greater influence of the in-company training activities.

An additional feedback effect can be observed if one considers the specific characteristics of the industry-specific vocational training. With the Craft Protection Act, industry was forced to put its training activities under the supervision of the crafts. This led to a similar structure to the "traditional" apprenticeship of craftsmanship, which, however, reformulated and systematized according to their own industrial requirements. From the late 1930s onwards, the apprenticeship in the industry became also a formal equal status to the craftsmanship's one, but nevertheless the industry developed its own modes of qualification, the skilled industrial labor training (Facharbeiterausbildung) and the training of skilled workers (see Greinert, 2015, 53ff.).

Other unexpected social actors we can find being involved in the development of German vocational training. The engineers, who are progressively establishing themselves as professional groups within the growing industrialization, especially those of the mechanical and the electrical engineering, must be highlighted.

"(...) At the end of the 19th century, the masters had a »supreme position« in many machine factories. The fall of the master system was the declared goal of scientific engineers around the turn of the [19th zo the 20th, note StW.] century."[15] (Radkau, 2008, p. 204).

The rationalization efforts, the introduction of the Taylor system of rational management in German production plants, had always the goal to increase the importance of the engineers in production issues against the masters. The industrial vocational training offered itself, as it were, as a field of action in the delimitation of the "Handwerkerschlendrian" (W. v. Siemens, cited in Hanf, 1987, p. 158)[16]. A vocational training, which followed rational aspects and was subject to a technical logic and efficiency, offered the approach to a solution for the machine industry, which sought for concepts to close the qualification gap. The role models, which were taken into account, already existed in the workshops of the railway industry. There, since the 1850s, the most recent international training procedures such as the course method (Lehrgangsmethode) and its own structure and regulations e.g. syllabus and medias were developed (see Ploghaus, 2003).

At the same time, the industrial companies realized that the brachial enforcement of the Taylors system in Germany produced considerable resistance within the company (Machtan, 1981; Homburg, 1978). But they did not see a solution in a strong technological way of closing the qualification gap as for US-American production model, which is detailed described in the study of HANSEN (1997) due to the already above mentioned structural reasons. Nonetheless, they proved models of dequalification for factory work. As RINNEBERG (1985) showed, this process led rather to a disruption of industrial training conditions at the end of the 19th century.

It is also interesting that formal vocational qualifications were also introduced in the mining and iron and metallurgical industry at the end of the 19th century. In the years before, in the high industrialization phase, this industrial sector was satisfied with the overwhelming recruitment of unskilled labor. This was also due to their special situation, as they were established in regions with little infrastructure, because of the sufficient supply of the necessary raw materials. They could not make use of existing industry landscape or skilled workers from the crafts (see Hansen, 1997), but rather had to use a segmental qualification concept, a concept which focused on the individual company recruitment strategy. The Rhenish heavy industry, however, developed beyond the

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[15] The German original: „(…) [N]och Ende des 19.Jahrhunderts besaßen die Meister in vielen Maschinenfabriken eine »überragende Stellung«. Der Sturz des Meisterssystems war um die Jahrhundertwende das erklärte Ziel der wissenschaftlichen Ingenieure."

[16] Meant is the behaviour of jog trot of the master craftsmen, also declared pejoratively by W. v. Siemens as artisan craft working style

individual company approach, an independent collective concept of vocational qualification (see Harney & Tenorth, 1986; Tenfelde, 1979). Nevertheless, the concepts of the mechanical and electrical industry differed considerably, which looked at "vocational training as an integral part of the scientific management" (Greinert, 2015, p. 57) and introduced rationality and objectification into the training.

The concept of the heavy industry followed much more an ideologically driven concept of vocational qualification and led the struggle for the "soul of our worker" (quoted in Kipp, 2008, p. 23). Through ideological influence of the workers the class antagonisms should be defused, in a “work community” the loyalty of the industrial workforce against the company should be secured and the socialist efforts of the labour force be suppressed (see Kift, 2012; Seubert, 1993; Kipp & Manz, 1985).

Both groups of actors in German industry founded intermediary organizations for their collective interests, such as the metal and electrical industry in 1908, the German committee for technical schooling (Deutscher Ausschuß für das Technische Schulwesen - DATSCH) and the heavy industry in 1925, the German Institute for Technical Work Training (Deutsche Institut für technische Arbeitsschulung - DINTA). Both were in sharp competition with each other. In the historical retrospect, it can nevertheless be stated that the activities for the rationalization of vocational training by the DATSCH were more successful (see Herkner, 2013). Their rationality efforts, characterized by the training workshop, and company owned training school (Werkberufschule), which merged later on mostly in the public vocational school except for those of Siemens. The methodical systematization by means of teaching and standardized courses and professional systematic formulations of standards by occupational standard, training plans and examination requirements (Greinert, 2015, p. 57) outlasted and still characterize the German Dual vocational education and training. They also succeeded in establishing a successful social integration model for industrial workers through training beyond of ideological influences and soul catching of the workers. The DINTA course for the training of metal workers with the programmatic name "iron educates" from the 1930s, on the other hand, remains now only anecdotal.

Finally, there is one last additional actor in the development of vocational training. It was the state administrations. They were also in the feedback processes and interactions with existing regulations, mode of orders and traditions and were not free and independent in their decisions. Thus in the South West German countries there was a craft promotion policy, which was strongly influenced by the existing small-scale regional institutional orders structured as industry landscapes (see Radkau, 2008, a clearly illustrative, socio-cultural and cultural view illustrating these change mechanisms in a case study see in Maurer, 2013). In Prussia, on the other hand, business promotion was quite different in the region, but it was always linked to the development of educational institutions (see Niehues, 1994; Meyser, 1994). The structure of today's dual system is not conceivable without the involvement of state administrations and political decision-makers, but historical institutionalism also shows that the state as a main actor did not act in isolation, but was involved in a framework of favoring obstacles, social actors' constellations, and feedback effects.

5 Conclusion - Egyptian Presence in the Mirror of German History

Even if we move on a narrow ground with our present conclusion, we dare to combine both perspectives. The view on Egyptian vocational training and its practice, as far as we could gain insights into by investigations and observations on the ground, especially in cooperation with a large Egyptian construction company (Wolf, 2013; Wolf & Meyser, 2014) and additional with intense field studies, is linked with the historical development of the German vocational education and training system deployed here.

In Egypt there is a strong form of traditional vocational training, the overwhelming majority of construction workers are recruited from traditional forms of work. They can often carry out their occupational activities through traditional apprenticeship training or have learned to work on-the-job in informal arrangements of a social interaction process (see Frost, 2008; Assaad, 1993). These traditional forms of work are closely linked to the cultural convictions of the working population, which stem from old, not yet capitalistically modernized societies (see Didero, 2012; Al Amry, 2008; Chalcraft, 2006; Bourdieu, 2000; Posusney, 1993; Semsek, 1986). At the same time, however, there is a comparatively modern state, whose administration is trying to enforce state

rights and social extension. This administration adequately satisfies formally the demands of rational state-building, even if it is frequently used for other purposes, for example, to ensure the material supply of persons who are in clientele relations with an influential state politician.

The formal vocational education and training system can positioned to the ideal type of a school-based vocational education and training system based on rational bureaucracy, similar to the concept in France as mentioned at the beginning. In essence, it conforms to internationally accepted concepts at the formal level, but is not successful with respect to the delivery of usable qualifications for the labor market, as already mentioned in section 2 (see supplementary Aref, 2012). For this reason too, there is a highly complex collection of very different activities in initial and continuing vocational education and training (see above) in Egypt. A combination of tradition with modernity, as we can tale about German vocational education and training, could also be a sensible approach in Egypt to take advantage of the country's opportunities. Many efforts to this end are certainly necessary to find good solutions including more research in education and social sciences to better understand the relation between modernity and tradition in the Egyptian context. A promising idea would certainly be the formal recognition of informal and non-formal learning outcomes in order to open up further vocational and / or professional careers through vocational training include the academic track.

Similar to the development phase of the German vocational training system, Egypt can show large and powerful companies. This is where the two largest construction companies in Africa are based, the largest being a state-owned construction company, the other a private construction company. On the other hand, the majority of informally organized economic sectors can be found, so that a dualistic economic order can be assumed. This is also a similarity to the development phase of German vocational training (see Lutz, 1984). The construction companies, as well as the other modern industrial enterprises as far as they can be estimated, have a great demand for modern qualification concepts and training activities, but the workforce is recruited from a traditionally organized training system, with insufficient qualifications for modern companies, similar to the referred situation in historic German industry.

The company side repeatedly criticizes, during discussions or expert conversation the fact that the workforce does not meet their requirements. At the same time, however, this requirement is delegated to the public administration and the state, which is asked to provide the required qualifications of the workforce. Own stronger training activities on the corporate side, according to our observation, are very few. The qualification on the construction sites is based on a training-on-the-job, with low investment on the part of the entrepreneurs in the personnel resources of their workforce. If more activities are carried out, this is done according to the segmental concept outlined above. On the other hand, the focus is on the engineers, hardly on the workforce. An idea that the establishment of intermediary organizations could lead to collective qualification concepts does not yet exist, if we follow the conversations and interviews. A decisive moment in the successful development of a powerful Egyptian vocational training will be the commitment of strong Egyptian companies whether they are willing to invest more in the qualification of their workforce. They can develop this either as segmental single solutions, or, from a German perspective, better than collective solutions with qualification concepts for whole sectors, similar to the German solutions at the end of the 19th to the first half of the 20th century. The development of cooperative vocational training models, similar to the German Dual System, presupposes corporate associations, i.e. collective approaches to solutions, as individual companies are slightly taken the second place to the state education administration.

Under a perspective of historical institutionalism we could address a favouring obstacle to the fact of the huge fallacy of public provision of workforce qualification to the needs and requirements of private business since long time. Additional the strong limitation of the private business success through the internal rules and structures of the military government and the military-industrial complex of the Egyptian economy could also see as such a favouring obstacle because the path to cheap labour production and low quality is occupied by the military economy. The resort for the private business could be the quality production and service with motivated, loyal and high skilled employees.

Under the social actors perspective of the historical institutionalism we can state that in Egyptian companies, as far as observable, a comparatively conflict-rich interaction relationship can be found between the university

trained engineers and the workers coming from practice ground. This applies in particular to the relationship with the foremen and supervisors, which have in Egyptian companies a similar position as the master craftsmen in the historic German industry. In Germany, this tense relationship was also mitigated by the introduction of rationalization-led modern industrial training as mentioned above. Whether this could similarly occur in Egypt by the joint responsibility of foremen and engineers for a modern company based training must also be left open here, but it will depend on the social processes of modernization of Egyptian business.

In the historical phase in Germany, other unexpected players came onto the field, in particular the trade unions are prominently highlighted above. In Egypt, the new free trade unions - labor union, which have overcome the limitation of professional trade unions - trade union, have played an important role in social disputes and on the political upheaval of 2011 against the Mubarak government (see Abdalla, 2012). Their future importance in the development of vocational education and training in Egypt cannot be overlooked because of the absence of related studies and insufficient knowledge of these trade unions, but what we know from the historical process of shaping a mode of qualification for work and employment is the important role of collective social actors of the economy. Unions are one type, business association are one other, informal institutions as we could observe them in the construction industry a third. And we should not forget families and other social associations in the development of modes of qualification for work and employment. But for a more precise assessment of their possible role in the organization of vocational training in Egypt, it requires specific studies and investigations. Nonetheless, the historical experience in Germany shows that the workforce played an important role in the implementation and development of modern German vocational training. Successful and high-quality vocational training must be socially acknowledged, that is, to offer people a perspective on a better life, only then the people of a society will accept the offers of vocational training and develop it through their own commitment.

If, under the perspective of feedback effects and critical transposal points, the establishment of a new Ministry of TVET in March 2015 marks a critical turning point is not to be overlooked at the moment. But the new government turns back in September 2015 the newly established ministry to a deputy ministry under the umbrella of the big Egyptian ministry of education, now with the annex of training – MoET. That changes express at least a higher importance of the vocational and technical education in the politics of the country. The openness of the deputy ministry and the efforts he has done during the last years could produce some unexpected feedback processes especially towards the involvement of the private business in the provision of initial and continuing VET provision. It could adjoin to the remarkable higher activities in training provision of private businesses in the formal part of public training provision too and not solely in the company based informal or non-formal training provision.

Although Egypt is in a difficult domestic and foreign politic situation, we are confident that the progress of the development of vocational training in Egypt will continue. The commitment and development in vocational education and training is a central challenge for the Egyptian economy and society. We are convinced that the way of looking at the history of German vocational training in Egypt can be fruitfully discussed here and hopefully will produce smart inspirations in connection with in-depth related studies.

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