European Patterns of Successful Practice in Vocational Education and Training

Methodology Paper

VET

EUROPEAN AGENCY
for Special Needs and Inclusive Education

EUROPEAN PATTERNS OF SUCCESSFUL PRACTICE IN VOCATIONAL EDUCATION AND TRAINING

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European Agency for Special Needs and Inclusive Education

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1. PREFACE

The 'Vocational Education and Training: Policy and Practice in the field of Special Needs Education (VET)' project has identified and investigated the key aspects of vocational education and training for learners with special educational needs (SEN)/disabilities, aged between 14 and 25, with a clear link to employment opportunities. In particular, the project has analysed **'what works'** in VET for learners with SEN/disabilities, **'why it works'** and **'how it works'.**

More than 50 country experts have been involved in the project activities, from 26 countries: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. Their expertise and competence have made a valuable contribution to the reflections and discussions that took place in project meetings, as well as to the development of the methodology and the main project outcomes. (Please see Annex 1 for a list of participants.)

The project has been largely supported by a Project Advisory Group (PAG) of Agency Representatives. Throughout the project this PAG also met with representatives from the Organisation for Economic Co-operation and Development (OECD) and the European Centre for the Development of Vocational Training (Cedefop) to ensure consistency with other European and international initiatives in this area of work.

The VET project has led to a number of outputs all of which are available from the project website: http://www.european-agency.org/agency-projects/vocational-education-and-training. These include:

- **a literature review**, providing the conceptual framework for the project and including a review of international research literature on project themes;
- **country reports**, providing information on the general Vocational Education and Training (VET) system as well as on the VET system for learners with SEN/disabilities in the participating countries;
- **a summary report** on the 'state of the art in Europe' with regard to policies and practices in the area of VET for learners with SEN/disabilities;
- **study visits reports**, with detailed information on the 28 VET practices analyses;
- ***European Patterns of Successful Practice in Vocational Education and Training* report**, developed as a result of a coherent and comprehensive analysis of 28 VET practices.

A further output is this paper on the methodology employed in the project for analysing the study visit outcomes and for setting up a VET system model. While the *European Patterns of Successful Practice in Vocational Education and Training* report focuses on the key outcomes and the recommendations, this paper is concerned with the methodology applied to identify patterns in complex settings such as vocational education and training, and with the implications of this approach for policy-makers and practitioners.

Cor Meijer

Director

European Agency for Special Needs and Inclusive Education

2. INTRODUCTION

The purpose of this paper is to present the methodology applied in the project 'Vocational Education and Training: Policy and Practice in the field of Special Needs Education (VET)' to analyse the 28 selected examples of successful VET. However, this document is not a scientific paper. Rather it aims to serve the same target group as the *European Patterns of Successful Practice in Vocational Education and Training* report. While the main report aims to give a concise overview on outcomes, this paper elaborates on the methodology used to make it replicable and verifiable.

This paper is structured as follows: after the preface in section 1 and this introduction, section 3 details the procedure used to select the 28 examples of successful VET. Section 4 explains the structure and procedures followed consistently during the study visits. Section 5 covers the whole analysis that, in practice, was split into different steps. Based upon the identification of supporting and hindering factors found in the 28 examples (section 5.1), a VET system model was developed that would underpin recommendations aiming to improve the performance of VET systems (section 5.2). The section concludes with a basic analysis of this VET system model (section 5.3). Section 6 elaborates on three different uses of the VET system model and explains how to apply it in practice. Finally, the advantages and limitations of the chosen methodology are discussed in section 7. A series of annexes completes the paper.

3. SELECTION OF EXAMPLES

In order to conduct an analysis of VET practice in 26 countries, the participating Agency member countries agreed upon a common framework and a methodology to ensure the validity, homogeneity and efficiency of the project approach and the subsequent analysis. Small teams of experts and project participants visited individual examples of VET for learners with SEN/disabilities in each of the participating countries and analysed the individual study visit outcomes.

The aim of the study visits and the final analysis was to identify and investigate the key aspects of VET for learners with SEN/disabilities aged between 14 and 25, with a clear link to employment opportunities. In particular, the objective was to understand ***what* works** and gain a deeper understanding of ***why* it works** and ***how it works*.** The focus was on the content of the VET programmes, on the settings in which these programmes were operating and on the main VET results in relation to the labour market.

The first step of the process involved selecting examples of successful national/local VET programmes for learners with SEN/disabilities in every participating country. A number of aspects, criteria and parameters, proposed by the experts during the project kick-off meeting, was taken into account when considering 'successful' VET for learners with SEN. The list of criteria and parameters (see below) was used to ensure that the examples of national/local VET programmes selected by the experts, for the analysis of country practices, would provide insights into successful VET approaches.

This list incorporates all the criteria proposed by the project experts, in no particular order. All elements were considered equally important for the selection of examples of VET programmes for learners with SEN.

The selected examples were required to meet at least some – but preferably all – of these criteria/parameters, and all the examples had to clearly show an inclusive approach to VET for learners with SEN.

The selection criteria/parameters for examples of national/local VET programmes state that successful VET for learners with SEN should ensure quality and the development of quality standards by:

- enhancing opportunities for accessing and attending VET programmes, but also completing the education and training programmes and acquiring the skills needed;
- providing good quality VET programmes, which lead to increased employability and, as far as possible, to a professional career;

- providing general and professional competences through broad and balanced curricula (defined as including knowledge, skills and attitudes) by combining general courses with professional courses. VET should provide:
  - basic skills, the so-called 'generic competencies' or 'soft skills' (including the ability to identify, analyse and solve problems, the capacity to learn new skills and adapt to new work tasks, the ability to communicate with others and to learn and use information independently) and 'self-determination skills' (that will facilitate learners to communicate and interact at work, to act autonomously, make choices and decisions regarding their own quality of life and lead them to an independent adult life);
  - technical skills and ICT opportunities to develop the skills needed by the labour market and provide skills practice in the workplace;
  - entrepreneurial skills and the ability to set up a new business, together with an awareness of civic responsibility.
- using the education and work opportunities chosen by each individual to plan flexible, continuous and coherent pathways through the various educational levels and sectors (e.g. individual transition plans) to ensure meaningful participation by all learners;
- promoting affiliation issues, such as job identity, a sense of belonging, self-esteem, learner satisfaction, self-advocacy and stretching each learner's potential;
- providing a powerful learning environment through effective leadership, inclusive pedagogy, appropriate support and individual attention for learners, teachers and other professionals within a collaborative framework, including an appropriate number of learners in the class;
- using person-centred approaches to plan services and training;
- providing high-quality, well-educated teachers (at present teacher education often fails to support teachers in including learners with special needs), well prepared practical trainers and other professionals trained in inclusive approaches and supported through mentoring;
- providing good guidance, career counselling and placement, including job coaching and an appropriate support framework. Support should continue after VET with coaching and mentoring and access to job placement services or help with finding additional training;
- developing individual education plans with a long-term view;

- providing good facilities, specialised centres and support services for training and education providers;
- providing effective pedagogical methodologies (e.g. learning by doing, learning on the job and delivering accredited/validated work experience) and apprenticeship and pre-apprenticeship training options;
- using assessment for learning, assessment of learning and assessment as learning (e.g. portfolio) and effective and collaborative assessment methods;
- providing qualifications/diplomas for all learners. The qualification structure should recognise what people have learned in terms of job outcomes in order to improve long-term employability and vocational mobility;
- implementing effective internal and external accountability systems to monitor and evaluate on-going work and longer-term outcomes, following up learners after they have obtained qualifications;
- developing co-operation and effective multi-disciplinary practice through co-ordinated networks between education, employment and social policy administrations, as well as between institutions working with/for the individuals;
- developing co-operation between learners, teachers, parents and the labour market. Strong family involvement should increase awareness of employment as a realistic and positive outcome;
- revising benefits systems to avoid loss of income when learners find employment;
- promoting effective work with employers and work placement providers to encourage them to support young people. Financial incentives for employers may also be considered;
- promoting policies with a long-term vision, as well as consistent and coherent legislation and policy statements relating to participation, inclusion and protection of rights;
- including a good transition process linked to autonomy in work, daily life and society;
- making best use of state-of-the-art knowledge by sharing knowledge and experiences.

With regard to an inclusive approach, the differences between the various VET systems of the participating countries have to be taken into account. It became evident that some of the examples made reference to separate training

programmes for learners with SEN/disabilities. However, it was agreed that, in addition to the focus on inclusion, consideration should also be given to VET programme outcomes, i.e. the extent to which programmes prepare learners to find a job in the open labour market. For this reason, some segregated programmes were included.

The participating countries carried out the selection process without input from the Agency. Project experts and national contacts provided short descriptions of their examples to help other experts to select examples of interest to them. The Agency did not assess the extent to which the selected examples conformed to the criteria/parameters proposed for their identification.

4. STUDY VISITS

The aim of the practical analysis was to explore factors that might have a positive or negative impact on VET processes and the outcomes for individual learners with SEN/disabilities. The process also aimed to explore the inter-relationships between different factors, as some might be essential, whilst others might be contradictory or mutually exclusive.

Study visits were made to all participating countries. Two or three country experts joined each study visit with one Agency staff member to work with local partners and stakeholders connected with the host VET programme. The small groups minimised interference with on-going teaching/learning processes during the visits. In several cases, the teams were able to observe in classrooms or learning settings in order to form their own impressions of the specific approaches. Furthermore, the small groups facilitated discussions with learners and parents/relatives.

The country experts were asked to prioritise their professional interests. They were then provided with short descriptions of each example to enable them to choose an example in line with their expressed interests. Therefore all teams were highly committed to gaining a deeper understanding of the examples. The study visit programme, which lasted from November 2010 to June 2012, comprised 28 study visits[1] to the selected VET examples, with the involvement of more than 50 experts.

The experts' task was to familiarise themselves with and better understand each VET example and investigate the factors that appear to facilitate both the way VET is carried out and the outcomes of each particular VET process.

The study visits comprised three inter-related and equally important parts:

1. Meeting with the stakeholders.

Aim: to present the project and discuss key issues with the different stakeholders involved in the VET process in order to gather information from different perspectives (e.g. service providers, head teachers, teachers/trainers, other professionals, young learners, families, local employers, finance providers, local policy-makers, non-governmental organisations, etc.).

2. Visit to the location of the VET programme.

Aim: to gather information about the site and local activities, and talk to professionals and young learners in order to gain a deeper understanding of the VET programme and the main outcomes in relation to the labour market. This part also included visits to local companies and discussion with employers and young learners who were carrying out their practical training and/or had a job after graduation.

[1] In the United Kingdom, examples were visited in England, Northern Ireland and Wales.

3. Expert meeting.

Aim: to discuss and consolidate the observations and information provided about the VET provision through the study visit and the discussions with the stakeholders involved.

Most of the study visits lasted for two full days. The meetings with stakeholders and the site visits took 1.5 days, with the remaining half-day for the expert meeting. The hosts were provided with a suggested plan for the study visit in advance, which aimed to help them to manage the visit and ensure that all the essential issues were addressed within the two days.

All three parts of the study visits were documented. Notes and pictures taken during steps a) and b) were consolidated in a report for each visit. Additional documents provided during a study visit (e.g. presentations, handouts) were also collected and made available to all experts on the project website (see: http://www.european-agency.org/agency-projects/vocational-education-and-training/vet-files/access-to-the-28-study-visit-example-details).

Stakeholders and/or hosts (except where they were the nominated project experts) did not take part in the experts' meeting on the last day (see part 3 above) to guarantee a neutral perspective, as far as possible. Furthermore, as the study visit teams were led by three different Agency staff members, an agreed structure for the discussion was used to increase consistency. The following main topics were addressed:

- *Policies and measures*. What policies and measures contribute to this example's success by supporting the implementation of equal opportunities for learners at the institutional level?
- *What is the project's highlight?* What are the main qualities and valued aspects of the example from the study visit team's point of view?
- *Role of stakeholders/stakeholders' views on the example*. What do employers, learners, parents and the municipality say about the example's quality and what are their criteria for quality? What external recognition and impact do the study visit team observe?
- *Methods*. What are the particular strengths of the training methods used with learners in this example and which approaches support successful transition to the labour market?
- *Challenges and comments*. What areas could be improved to make the example even more successful?

- *Personal resources*. What staff roles have the study visit team observed in the example and what formal and informal qualifications are required for each role to make the example work?
- *Other.*

The documentation from the discussions held on the last day was not made public, but was used internally with access given to all country experts. These documents included the consolidated experts' view on the particular example that was also used for the subsequent analysis.

5. ANALYSIS OF PRACTICE

The project's final step consisted of coherently and comprehensively analysing the individual study visits and identifying issues that collectively provide the added value of this Europe-wide study. The 28 individual results, summarised during the discussions among experts on the final day of each visit, were analysed to extract the similarities and differences with regard to *why* the example was successful**.** Experts' experiences of previous projects, together with the literature review, had already identified numerous factors as being conducive to successful VET for learners with SEN/disabilities. One form of analysis could therefore have been to consider the 28 examples against a given checklist of 'success factors'. However, the project experts decided instead to produce a completely new list of factors.

5.1 Identifying supporting and hindering factors

The study visit teams identified a large number of factors that supported or hindered effective practice. These were documented in the final discussions of each study visit. Qualitative analysis of the 28 discussion reports (i.e. consolidated notes of the experts' discussions) lead to 1,148 individual factors, each associated with a particular example.

These factors were sorted under three main headings: *structure/input* factors, *process* factors and *output/outcome* factors. Process theory was identified as an appropriate yet flexible framework that would provide deeper insights into 'why' these examples are considered successful. Outputs/outcomes in this model are considered to result from or be produced by a certain set of inputs/structures and a certain set of processes.[2]

The vast majority of factors belonged to the structure/input and process headings. Factors were added to the 'structure/input factors' category if they explained *the basis on which* a particular example was (un)successful. Further sub-categories identified under this heading relate to the policy context, structural links to the labour market, personal resources (e.g. qualifications, teacher–learner ratio, etc.) and the set-up of co-operation structures. Factors came under the 'process factors'

[2] However, experts highlighted that the VET reality is more complex. For example, while process theory implies a rather linear understanding of the 'production' of outputs or outcomes, observations in VET show that outputs/outcomes often impact on inputs and processes as well. Furthermore, VET is not an industrial or mechanical process that deterministically leads to predictable outcomes. The main reason is that people are involved in all phases of VET, in the form of learners, teachers, instructors, employers, colleagues, assessors, etc. Systems like the VET system, which contain people as system elements, are intrinsically of a complex nature. Hence, later phases of the analysis also considered links between structure/input, process and output/outcome factors in any direction.

heading if they explained *how* different elements in the VET system worked to render the example (un)successful. Sub-categories used under this heading were the implementation of policies and measures, training and teaching methods, personal resources with regard to the implementation of training and teaching and quality aspects of co-operation. No further sub-categories were found for the 'output/outcome factors'.

The project aimed to find similarities between successful approaches. These similarities should be immediately visible in the large set of factors. After first organising the 1,148 factors into the three phases according to process theory, further segmentation is needed. The analysis grouped identical or very similar factors together and formulated a heading for each group that aimed to describe the factors it contained. This 'coding' phase is an interpretative technique that runs the risk of losing the richness contained in the individual factors. In response to this risk, the project provides a list of all headings ('codes') and an explanation of the factors ('data') they contain (see Annex 2).

In the coding process, it was observed that hindering factors were rarely mentioned in the study visits. If they were mentioned, they always pointed to a missing success factor. Hence, all hindering factors were linguistically transformed into success factors.

Through this complex and time-consuming approach, 68 success factors were collected. Annex 2 contains a list of all 68 factors. Some of these factors were observed in many of the visited examples, i.e. they had a high frequency. It appears that these highly frequent factors are common to many of the examples despite different economic, policy, cultural or other contexts. Consequently, these were of particular interest for further analysis, which aimed to develop recommendations that would be applicable and useful in many different contexts. Irrespective of frequency, each success factor was considered essential in one or more examples and therefore all 68 factors are relevant.

Each individual factor identified by the project was already known from research and other studies, as well as from the country experts' own experiences. However, it can be seen that sometimes individuals make VET successful, despite difficult conditions, while in other cases, where the conditions seem to be optimal, VET is not as successful as might be expected. Furthermore, evidence from the study visits shows that any improvement of the VET system that focuses on single aspects (e.g. financial support of employers, quota systems, focus on practical training, VET extension schemes) has only a limited impact on the long-term success.

At the VET conference held in Cyprus in November 2012, experts discussed these 68 factors and highlighted both their relevance and their interconnection. Working

groups then developed and documented explanations for these connections. The conference outcomes indicated that, instead of looking into each individual factor's details, the project should rather explore *why* certain factors appear together and the implications of this view for the development of recommendations.

5.2 Developing a system model

5.2.1 Complex systems

It appears that education systems in general, and VET systems in particular, have a certain level of complexity. This complexity needs to be understood in order to draw meaningful conclusions and to develop effective recommendations. In this endeavour, it is beneficial to use tools and approaches developed by other disciplines to deal with system complexity.

Vester (1999) summarised more than 30 years' experience with complex systems in his report to the Club of Rome, *The Art of Interconnected Thinking: Tools and concepts for a new approach to tackling complexity*. In the report he highlights the urgent need to deal with complexity and use it as input for policy decisions and planning in a broad variety of application areas. According to Vester, key aspects of complexity include that: complexity requires networked thinking instead of linear thinking; complex systems cannot be optimised by only optimising their components/elements; the inter-relations of elements are (at least) equally as important as the system elements themselves; complex systems have control and feedback mechanisms which either regulate the whole system's behaviour or under-/over-steer (Vester, 1999).

The basic principles of complex systems theory have been applied in many disciplines and fields of practice. One of these areas is organisation management and links back to 1959. Stafford Beer (1959; 1985) developed a system approach to organisation management, defining *cybernetics* as the science of effective organisation. These ideas and others have resulted in the well-known St Gallen Management Model (Bleicher, 2011). Other areas of application include political systems (here the term *governance* is often used), medicine (e.g. dealing with *systemic effects* in the human body) and social systems (using terms like *systemic psychology* to study human behaviour and experience in complex systems). All these areas are concerned with using a more holistic approach to solve real world problems.

Systems approaches have also been applied to educational systems. For example, Kickert (1995) described the Dutch Ministry of Education's move from classical government towards more autonomy and self-responsibility in the area of higher education. This move was based on the firm conviction that government is only one

of the influencing actors in a complex network of inter-related, more or less autonomous actors in higher education. The OECD (2010) developed a systems approach to educational research and innovation in order to properly address the dynamics of innovation in education and enable educational systems to be better equipped to manage change in times of economic crises and rising unemployment. The main benefit of a systemic innovation approach, according to the OECD, is that it can help governments and other stakeholders to comprehensively evaluate how the system works and how they can enhance their innovation capacity.

Silvern (1967) has applied a systems approach to describe feedback signal paths from outside a secondary school or school district to an occupational teacher. Delahaye (2002) also applied a systems theory approach to VET, but with a focus on the management of knowledge assets in a VET provider organisation. Likar (2007) indicated the importance of a systems approach in VET to address the challenge posed to learners' innovation. His research on the key influential success factors shows that the teacher's role remains essential.

Common to all approaches is that complex systems like the VET system contain several elements (for instance: stakeholders like teaching staff, learners and employers; organisations like schools, companies and resource centres; activities like guidance, teaching and dropout prevention, etc.) that influence, or are influenced by, each other. These elements are connected to a greater or lesser extent. In this regard, in the context of the project the study visits aimed to gather information on the key elements of the VET system model by identifying the relevant elements of the VET system and gaining a deeper understanding of their inter-relationships.

5.2.2 Applying a systems approach

Rather than attempting to identify all elements of the 28 VET systems observed in the examples and to understand how the elements within each of these systems influence each other, the project attempted to reduce this inherent complexity by employing two particular measures. Firstly, only those VET system elements that were considered relevant for the success of the examples were subject to further analysis. Secondly, by focusing on those elements that appear in many or all of the examples, the project avoided looking at 28 VET systems individually. Instead, it put the commonalities of those VET systems in the foreground. Obviously, the *highly frequent success factors* fulfil both requirements: they are considered relevant and they were observed in the majority of the examples. Hence, highly frequent factors need to be part of the system model.

In order to set up a VET system model that comprises these success factors, it was necessary to determine if and how the factors influence each other. Highly frequent

success factors were easily determined by counting the frequency of each factor, with a minimum threshold of 14 occurrences (i.e. observation of this factor in at least half of the study visits). The 43 highly frequent success factors are marked with an asterisk (*) in Annex 2.

So far, success factors only cover the structure/input and the process phases. Modelling the complex VET system, however, requires an ultimate aim towards which all system elements are – or should be – aligned. In this project this aim is *successful VET and transition to the open labour market for learners with SEN/disabilities*.

It was nevertheless striking that few examples were able to present results other than basic quantitative data relating to learners' participation in courses, their completion of courses or their finding employment within a certain timeframe.[3] Many policies set high goals, such as improving the quality of life of people with SEN/disabilities and achieving full inclusion and equal opportunities. However, the means of assessing the achievement of these aims in practice are often very basic and cannot adequately address these complex concepts. Therefore, the output/outcome-related factors identified in the study visits were not suitable for the proposed system model.[4]

The question is whether the ultimate aim set out above is sufficient for establishing the system model, or if other outcome-related factors are missing. Many success factors seem to directly contribute to this one aim, but it was also observed in the visits that there are some other outcome-related factors that are, to some extent, preconditions to this main aim.[5] If the VET system fails to address just one of these preconditions, the ultimate aim will be difficult to achieve or to maintain. The following factors, discussed and agreed upon by the PAG, were therefore added to the list of success factors:

A. Learner's confidence that challenges can be managed

[3] This shortcoming might also hint at a methodological problem. The expert team asked for data and statistics, rather than asking which factors are considered relevant to determine the success of the specific VET processes. While (quantitative or qualitative) data is key to monitoring the effectiveness of processes, it is only a means – an indicator – for measuring the extent to which policy intentions have been realised.

[4] However, these factors were not completely disregarded. In the main project report (European Patterns of Successful Practice in Vocational Education and Training) they were used to discuss different types of data capable of monitoring outputs, effects, impact and outcomes.

[5] As the shortcomings became obvious just after all study visits were finalised, there is no documented evidence of these factors. They are based upon an ex-post assessment of all study visits and on PAG members' professional experience. This, however, necessitates further reflection in the discussion later on.

B. Matching labour market skills requirements and the learners' skills
C. Employers' confidence that challenges due to SEN/disability can be managed
D. Occurrence of a job vacancy in the appropriate geographical area at the time a learner is looking for a job
E. Matching work opportunities and learners' individual wishes and expectations
F. Successful VET and transition to the open labour market for learners with SEN/disabilities

A key to complex systems is that they are more than just a collection of elements. These elements are also inter-linked, i.e. they impact on each other. Hence, this completed set of 49 factors requires an analysis with regard to potential cause–effect relationships.

One approach would be to set up a 49 x 49 matrix and check for every possible combination of *factor a* and *factor b,* if *a* has (any kind of) an impact on *b* (provided that this impact was observed in the study visits). This procedure is time-consuming and carries the risk that single observations of a potential link between two factors could be over-represented.

To avoid over-representation of 'rare' links and to reduce the number of factor combinations, the project team started by analysing the correlations between all factors based upon the 28 study visits. The procedure and specific outcomes of this step are detailed in Annex 3.

Correlations, however, are not sufficient to explain any cause–effect relationship between *factor a* and *factor b*, as a high correlation might also be a consequence of a common cause without *a* or *b* being the reason, or the correlation might even be coincidental. Definite conclusions regarding the existence or direction of a cause–effect relationship cannot be drawn based upon the fact that *a* and *b* are correlated. Determining whether there is an actual cause–effect relationship requires further investigation. However, this step still has a benefit. Low correlation values indicate that two factors showed no relationship or a rare relationship in the 28 visits. Hence, it is possible to exclude those *factor a–factor b* combinations from further investigation and reduce the number of combinations to be checked.

Based on this preparatory correlation analysis, the PAG, together with senior experts from INSHEA and Cedefop, examined only those potential connections for which the study visits had produced sufficient evidence. In the analysis, the group decided whether there was a cause–effect relationship for each success factor combination (with a correlation over the threshold). Based upon the key question: 'Does factor *x* have a direct impact on factor *y*?', the following impact levels were available:

0. Factor x has no impact on factor y
1. Weak effect; huge changes in x have only a weak impact on y
2. Medium effect; changes in x have a similar impact on y
3. Strong effect; small changes in x have a strong impact on y.

While this scale seems straightforward, it was nevertheless difficult to apply it to some of the factor combinations. Furthermore, subjectivity and the PAG's personal experiences and professional background came to the fore. Hence, all combinations were assessed by the group instead of individuals, allowing for discussions, clarifications and agreements. Two PAG meetings were required to complete this task of developing a complex network of inter-related factors that reflects the reality of successful VET examples. Annex 4 documents this step's outcome. Only impact values 2 and 3 were considered for further analysis.

The result of this group work is a network of connected factors that establish a *VET system model*, which reflects the key characteristics of the 28 examples visited. This model has been expressed as a diagram that contains all the highly frequent success factors, with arrows originating from those factors that influence other factors. Due to its complexity, only excerpts from the model will be used (see section 5.3).

While the diagram of the VET system model is not easy to use, section 5.3 will introduce a basic system analysis that ultimately facilitates deeper insights into the connectivity and inter-dependency of factors to inform policy- and decision-makers on all system levels.

5.3 Basic analysis of the VET system model

5.3.1 Consistency check

Before starting the basic analysis of the system model, consistency with the underlying input/structure – process – output/outcome segmentation (process theory) was checked. This section looks at these three components of the system and cross-checks the impact that each part receives from other parts (blue) and the impact that it has on the two other parts (yellow).

Structure/Input: Structure or input factors are structures, provisions, qualifications, etc., that are provided within the system as a basis for its operation (i.e. processes). It is expected that all identified factors in the input section (i.e. factors starting with numbers 2, 3, 4 and 5) have some impact on process factors (i.e. factors starting with numbers 6, 7, 8 and 9) and only a small (if any) direct influence on output or outcome factors (i.e. factors A, B, C, D, E and F).

From the data it seems that input factors are only loosely linked among themselves (the average link intensity per input factor to any other input factor is 3.6, i.e. each

input factor has an average of 3.6 links to other input factors). The link intensity of each input factor to process factors is more than double, and 96% of its impact is directed to process factors and only 4% to outcome factors.

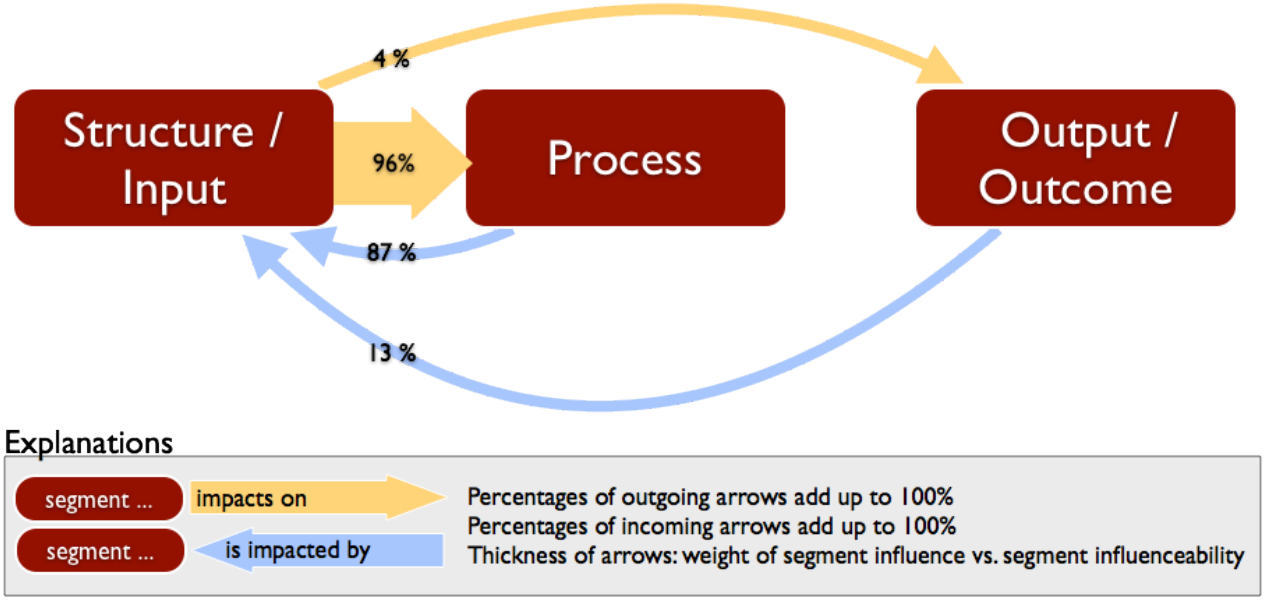


Figure 1 Influence and influenceability of the 'Structure/Input' model segment

Process: Process factors should show a higher link intensity to other process factors due to their inter-dependence in 'creating' appropriate outputs and outcomes. Processes should be mainly influenced by structure and input factors, but should also receive feedback from output and outcome. Process factors also impact upon structure factors.

The data shows that process factors are mainly influenced by structure/input factors (84%) and only a little by output/outcome factors (16%). On the other hand, process factors influence input as well as outcome factors, each with 50%.

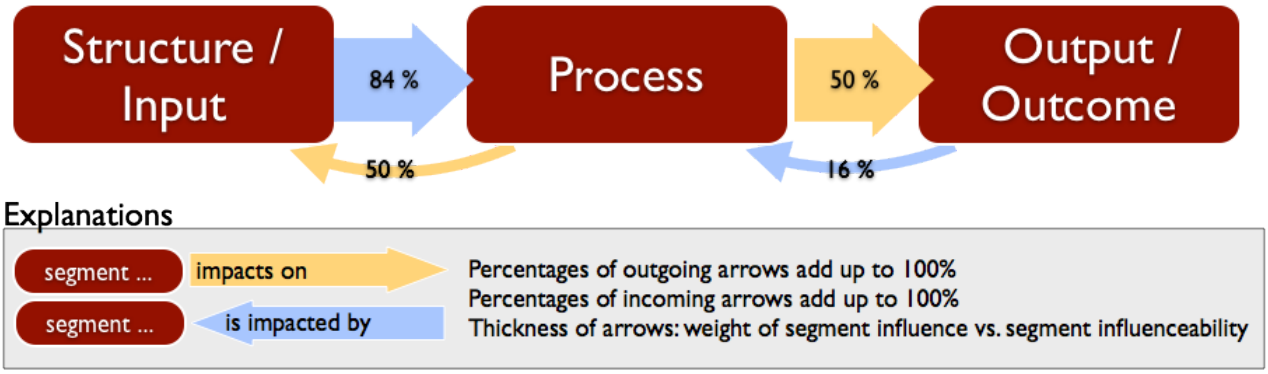


Figure 2 Influence and influenceability of the 'Process' model segment

Output/Outcome: Output/outcome factors are expected to be mainly influenced by process factors and only directly influenced by structure/input factors in a few

cases. As in most complex systems, outcome factors feed back to the system via links to process and input.[6]

The data shows that 93% of the impact on outcome factors originates from process factors and 7% from structure/input factors. Of the feedback, 68% impacts on process factors and 32% impacts on input factors.

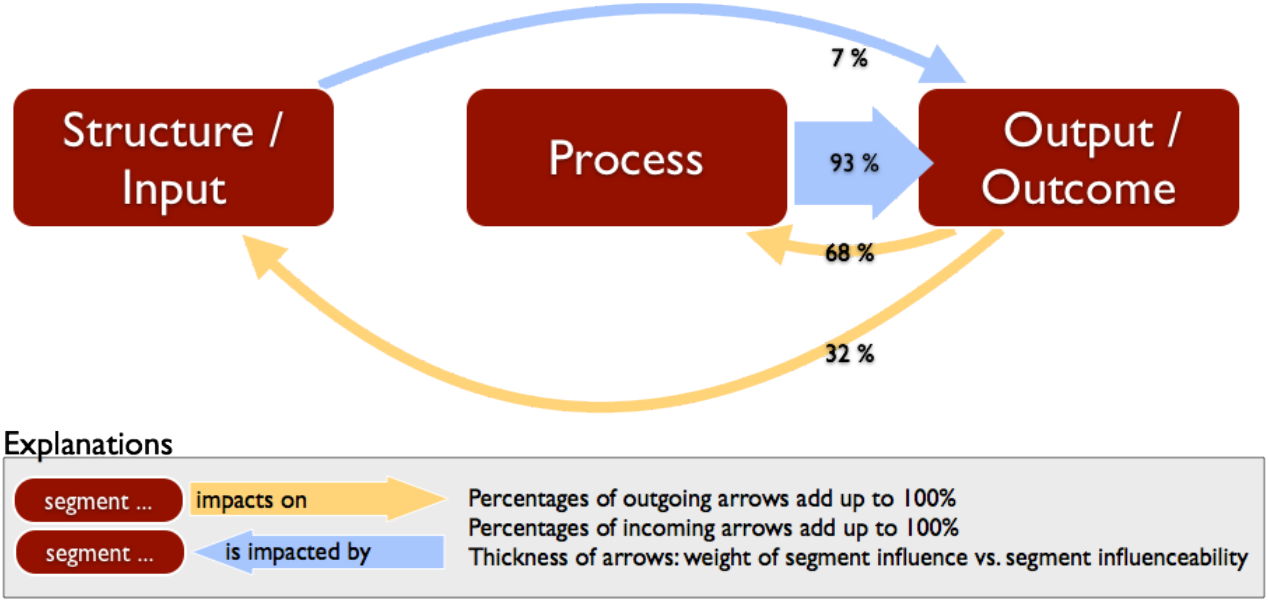


Figure 3 Influence and influenceability of the 'Output/Outcome' model segment

In conclusion, the data seems to meet expectations, i.e. no contradictions are visible. Yet, to use the words of Stafford Beer: 'a model is neither true nor false: it is more or less useful' (1985, p. 2). Consequently the remaining sections will focus on making the model useful to policy- and decision-makers.

5.3.2 Identifying patterns

The next step aims to reduce the VET system model's complexity. Different groups of stakeholders (e.g. learners, teaching staff, employers) are involved with different parts of the whole VET system, and consequently only those factors that belong to (i.e. that influence) the respective part of the system are of relevance to them. However, the VET system model does not yet distinguish different stakeholder roles, and factors are not assigned to respective sub-systems. As a result, the next step divides the VET system model into suitable parts by distinguishing the following four stakeholder roles:

- VET institution managers

[6] 'The principle of feedback plays an important role in systems theory and cybernetics. This principle stems from the insight in control engineering that a system with a feedback loop is more stable and better able to recover from disturbances' (Kickert, 1995, p. 150).

- VET staff
- Learners
- Current and future employers/labour market representatives.

VET institution managers are, for example, concerned with factor 2.2 (*'Having a school director with effective leadership*'), while the other stakeholders are not. Current and future employers/labour market representatives deal with factor 8.1 (*'Joint working, strong collaboration, good networking, an open spirit of co-operation'*). However, many success factors are relevant for more than one stakeholder group. For example, factor 2.6 (*'Having multi-disciplinary teams'*) is relevant for the VET institution management (because teams have to be managed), for VET staff (because each team member contributes to the educational and training process with specific competences) and for learners (because the learner is confronted with several people who are responsible for different tasks or subjects in the learning process).

Therefore, the dissection of the VET model should allow overlaps among the groups of factors associated with each of the four stakeholder groups. As these sections of the VET system model also represent the success factors that were repeatedly observed in the study visits, they are called *patterns*.[7] Table 1 provides an overview of the factors that belong to each of the four patterns.

[7] Annex 5 includes an overview of the factors that belong to each of the four patterns.

Table 1 Overview of the factors in each of the four patterns

Factors / Pattern	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.1	3.3	4.2	4.3	4.4	5.1	5.5	5.6	6.1	6.2
VET institution management pattern	x	x	x	x	x	x	x					x	x	x	x		x
Vocational education and training pattern						x	x					x	x	x	x	x	x
Learners' pattern	x		x		x	x	x		x	x	x	x		x	x	x	
Labour market pattern			x				x	x	x	x	x	x			x		

Factors / Pattern	6.3	6.4	6.6	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	7.10	7.12	8.1	8.2	8.3
VET institution management pattern	x		x			x	x			x		x					
Vocational education and training pattern		x	x	x	x	x	x	x	x	x	x	x	x	x			x
Learners' pattern		x	x	x	x	x	x	x		x	x	x	x	x		x	
Labour market pattern		x		x	x		x	x			x	x	x		x		

Factors / Pattern	8.4	9.2	9.5	9.9	9.10	9.11	9.16	9.17	9.18	A	B	C	D	E	F
VET institution management pattern		x	x	x		x	x	x			x				x
Vocational education and training pattern			x		x				x	x	x			x	x
Learners' pattern		x		x	x		x	x	x	x	x		x	x	x
Labour market pattern	x	x							x		x	x	x		x

Remark: The term 'pattern' has been introduced mainly as a concept to describe an effect known from many other areas, such as nature for example. Looking at a natural system while focusing too closely on a particular phenomenon might prevent the inter-relationships being seen (i.e. the bigger picture). Focusing on the shape of clouds (see Figure 4 left) is not sufficient to understand the context in which they appear (see Figure 4 right). Only from a certain 'distance' will a pattern become visible. This distant view might be helpful to understand the role of this element (here: cloud) in the context of the larger system. In the same way, the project aimed to find the right 'distance' from which to explore the VET systems and recognise the patterns hidden within the complex inter-relations among its elements.

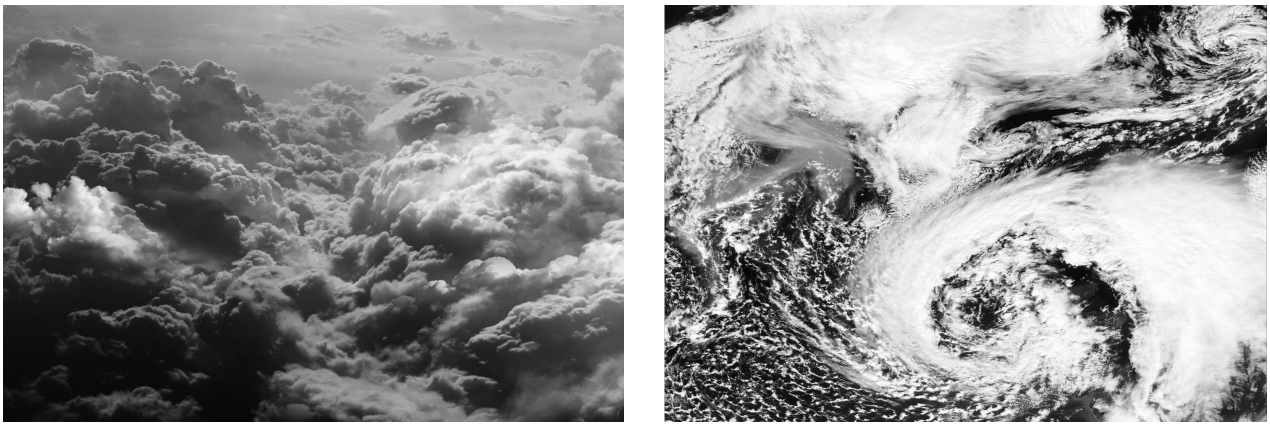


Figure 4 Clouds: close view (left) and distant view (right)

Figure 5 illustrates the four patterns (associated with the four stakeholder groups) and how they contribute to achieving the system's overall aim, i.e. providing successful VET and transition to employment for learners with SEN/disabilities. The policy level, represented by the outer circle, may impact upon the factors within the patterns. Recommendations for the policy level need to ensure that policies appropriately align with the relevant factors so that each pattern makes the optimum contribution towards the VET system's aim.

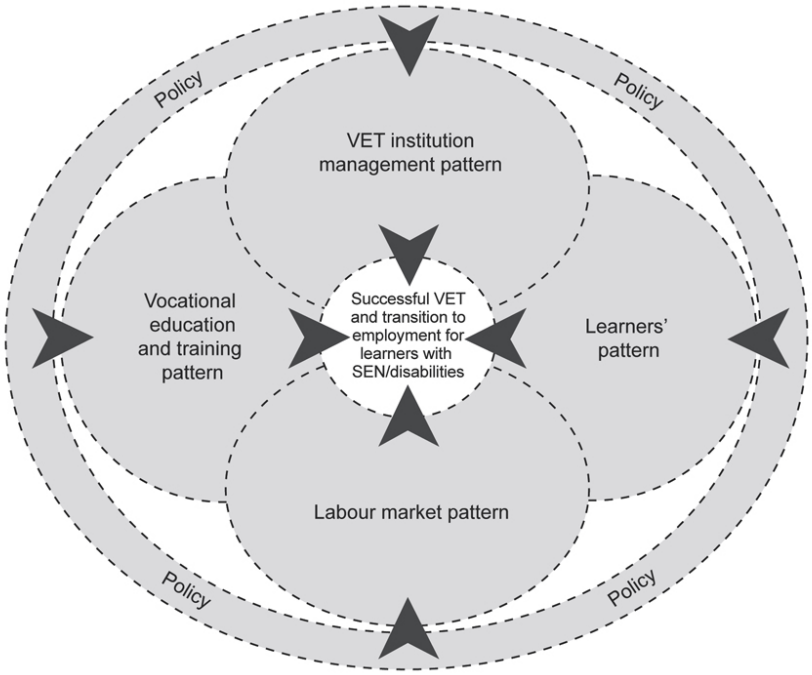


Figure 5 Schematic view of the VET system model and its four patterns

5.3.3 Factor impact analysis

A closer look at the VET system model shows that success factors are linked to other factors with varying intensity. Some factors impact upon many factors, while others hardly impact upon any other factor. A more systematic analysis of this observation will be beneficial in order to select factors for policy interventions that have the potential to impact on larger parts of the VET system.

Annex 4 contains a table (Table 4) that details each factor's impact level on each of the other factor. Adding the entries on each row of the table provides the so-called *active sum*. This sum is an indicator of the strength of a success factor's impact on other factors. In the VET system model this strength ranges from 11 as the lowest to 57 as the highest. If the factor with the lowest impact strength is changed (e.g. by an intervention), the impact on the whole system is likely to be low. If the factor with the highest impact strength is changed, it will impact on a larger number of other factors and is more likely to be noticed in the system.

Similarly, adding the entries of each column of Table 4 creates the *passive sum*, an indicator for each factor of how much other factors impact upon it. In the VET system model this passive sum ranges from 1 to 67. The factor with the lowest passive sum only 'depends' on a few other factors; it will be easier to influence this factor, compared to those factors with higher passive sums.

Depending on how much influence a factor has on other factors, or the extent to which a certain factor is influenced by others, all factors can be assigned to certain

categories with distinct characteristics (see Figure 6). For example, factors that are influenced by a few others, but that influence many other factors (called *active* factors), have the potential to impact on wider parts of the system. They are therefore considered a good starting point for interventions to initiate changes in the VET system. Factors that influence hardly any other factors (called *slow*/*absorbing* factors) will barely impact upon the system. Therefore they should not be a priority for intervention; rather it is suggested that this type of factor should be used for monitoring the system, e.g. by developing suitable indicators that make the state of this factor visible.

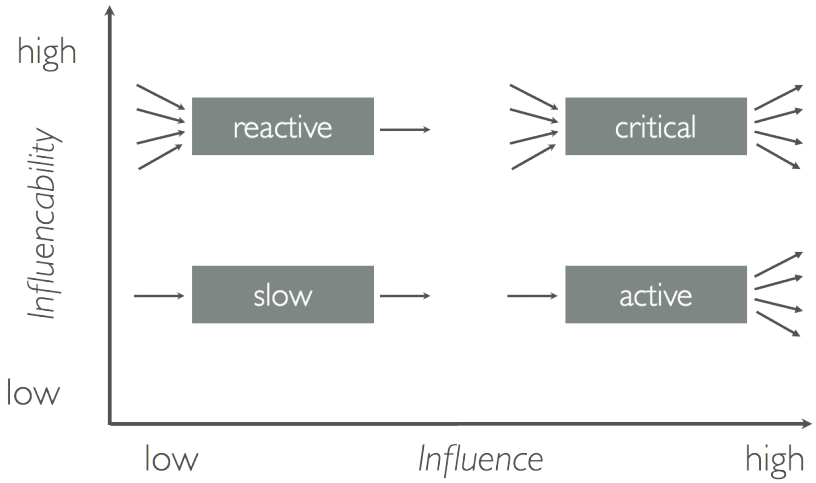


Figure 6 Categorisation of factors[8]

In fact, if the active sum and passive sum are combined, they can be used to describe each factor's characteristics. A two-dimensional graph with the passive sum as the x-axis and the active sum as the y-axis can indicate the type of each factor within the VET system model (see Figure 7).

Vester (1999, p. 235) identified eight different regions in the diagram and their characteristics (i.e. linked to the factors within this region), which will be helpful in making use of the system model:

1. Area with good levers that stabilise the system after it has been changed
2. Area of accelerators and catalysts, useful for a quick kick-off; care is recommended as they might over-shoot or break down
3. A particularly dangerous area, if it contains a whole bundle of interconnected factors
4. Area with factors where changes addressed to them is likely to be only of a cosmetic nature

[8] Figure adapted from Honegger (2011, p. 115).

5. Area with slow type factors, useful for experimenting
6. Area of useless interaction
7. Area with factors that are only weak levers, with few side effects
8. Factors in the middle can hardly be used for steering the whole system, but can contribute to self-regulation of the system.

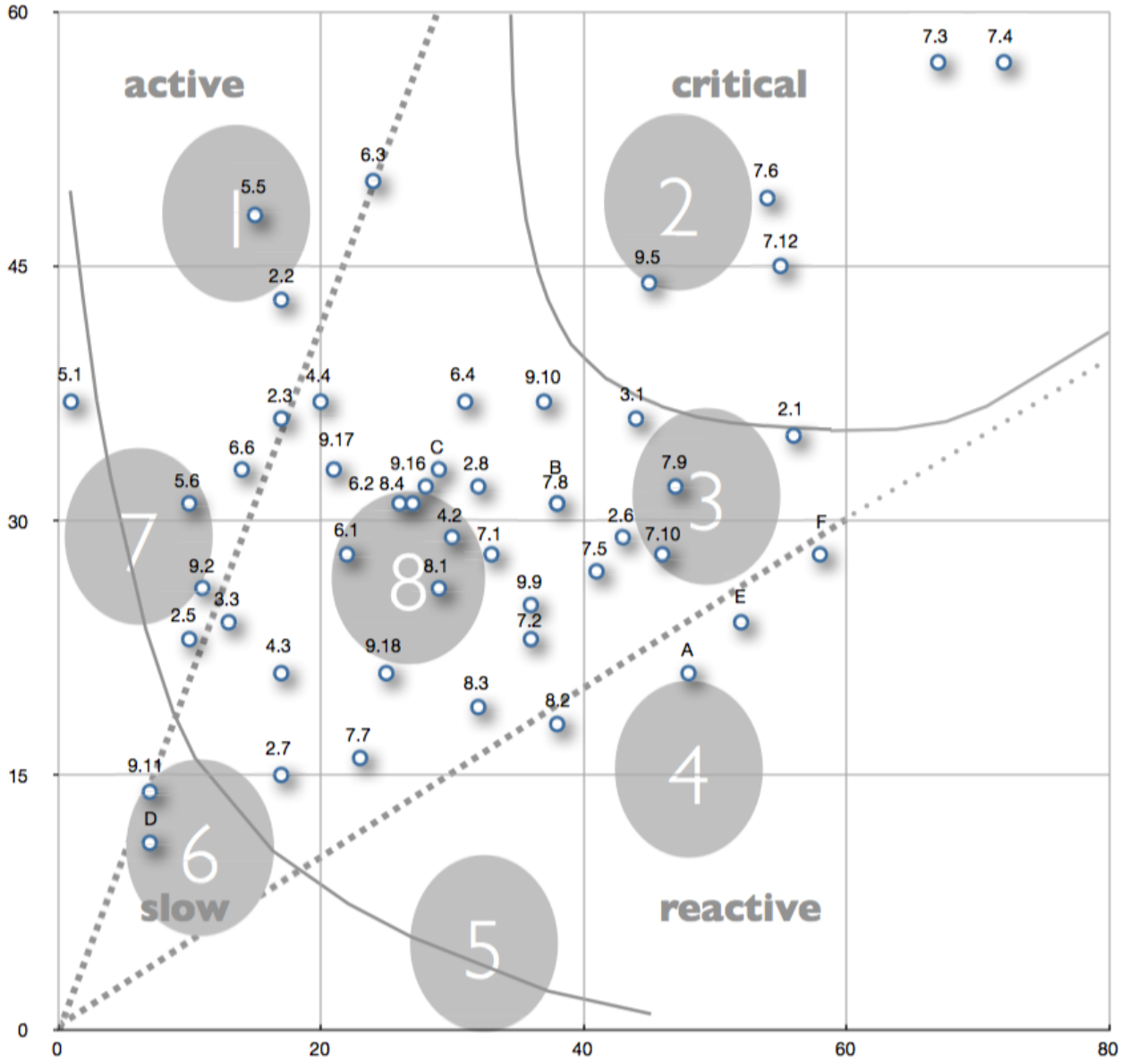


Figure 7 Two-dimensional graph of the active and passive sum for each factor

It needs to be stressed that the interpretation of areas in this diagram is based only on empirical findings. While these interpretations have proved to be helpful in a wide variety of domains, there is no proof that they are correct in the context of VET. However, as the justification of these areas is quite plausible, these area characteristics can be used as recommendations. Hence this type of additional

information can be used to develop recommendations based on the VET system model that are effective and – with regard to the efforts necessary for interventions to improve the system – also more efficient (see section 6).

6. APPLYING THE VET SYSTEM MODEL IN PRACTICE

Section 5 has described the methodology used to develop the VET system model. Due to the model's complexity, different 'views' have been generated from the point of view of four different stakeholders. Each view ('pattern') displays a less complex sub-system and provides stakeholder-specific access to the model, due to the fact that problems or issues within a system are often expressed from a certain stakeholder's point of view.

Such a system model, in principle, has the potential to be used in three different ways:

1. To help to identify areas where interventions are required
2. To inform decision-/policy-makers on the potential implications of planned interventions
3. To guide decision-/policy-makers in selecting suitable indicators for monitoring.

Within the project, the first two have been used to develop recommendations. Sub-sections 6.1, 6.2 and 6.3 provide more detail on all three potential uses.

6.1 Identifying areas for intervention

The system model comprises success factors and the inter-relationships between them. The model can therefore be used to check the extent to which real VET systems conform to this system model in practice. Wherever discrepancies occur between the model and a real system, further analysis and potentially interventions are recommended. This check should not only examine the success factors, but also the inter-relationships that might not conform to the model.

This analysis should take a multi-stakeholder approach to ensure that all perspectives are represented in the process. Consequently, the model reflects the four main stakeholder groups (i.e. VET institution managers, VET staff, learners, and current and future employers/labour market representatives) that need to be part of the analysis team.

Representatives from each stakeholder group should lead the discussion about their specific pattern. This may pose some challenges, particularly with regard to procedures that empower learners to participate on equal terms in these discussions, and also to the effective involvement of current and future employers. However, an equal representation of all stakeholder views is crucial to ensure that a VET system is aligned with the shared objectives of all stakeholders. This aim can only be achieved if all those involved in the VET process can openly discuss and work upon any lack of coherence encountered.

The analysis within the VET project was further complicated by the fact that 28 VET systems were analysed. The project's recommendations were expected to serve many or most of the participating countries. Consequently, the project aimed to identify those areas (i.e. success factors and inter-relationships between factors within the VET system model) where many countries expressed the need for further action. Aspects which the experts believed needed further attention were highlighted in discussions on the last day of each study visit.[9]

The following issues, linked to the respective success factors and inter-relationships within the system model, were identified in many of the 28 study visit examples:

- *VET institution management pattern*
  - School/VET institutional leadership
  - Managing multi-disciplinary teams
- *Vocational education and training pattern*
  - Learner-centred approaches
  - Using individual plans for education, learning, training and transition
  - Dropout reduction strategies
  - Matching labour market skills requirements and the learners' skills
- *Learners' pattern*
  - Focusing on learners' capabilities
  - Matching work opportunities and learners' individual wishes and expectations
  - Having established co-operation structures with local companies for practical training and/or employment after graduation
- *Labour market pattern*
  - Safeguarding connections with local employers/companies for practical training and job opportunities based upon trust and past experiences
  - Supporting learners and employers during the transition phase into the open labour market

[9] Obviously, the VET project did not follow the recommended multi-stakeholder approach in this particular step. Time constraints, as well as the narrow focus of each study visit (i.e. on a specific example and not on a whole country's VET system), did not allow for this procedure. Consequently, it is recommended that each country further specify country-specific areas (i.e. success factors and inter-relations) with the participation of all required stakeholders.

- Providing follow-up activities to maintain learners' employment in companies.

This list of issues shared among countries is already an outcome that can be used productively. Sharing approaches is a highly valued approach for enabling countries to learn from each other and develop systems iteratively. Nevertheless, the exchange of approaches itself is difficult, given the complexity of VET systems. The descriptions of each country's VET system (as undertaken in the context of the VET project on the project website) follow a certain structure and logic and might develop the content at a level of detail which makes it difficult to identify the areas for learning.

However, the issues identified in many countries and listed above may provide a more efficient way of focusing country-specific VET system descriptions on the areas of shared interest. If mutual learning among countries could be supported, for example, by a conference in which countries could detail their VET approaches and provide insights into their specific methodologies and practices, a focus on the shared issues would contribute to more efficient use of limited time and would likely increase the perceived benefit for all participants.

6.2 Informing interventions

Once problematic areas that need further attention have been identified, the system model provides further information that can be used to increase the effectiveness and efficiency of interventions.

Assuming that the system analysis (described in sub-section 6.1) resulted in a (prioritised) list of problematic areas, the categorisation of success factors (see Figure 6 and Figure 7) can be of added value. Active factors that may have the potential to impact upon wider parts of the system can be identified. These are therefore considered a good starting point for interventions to initiate changes in the VET system. On the other hand, slow/absorbing factors will barely impact upon the system. However, any impact on the system is ultimately required to impact positively on the outcome factors (factors A to F; see section 5.2), which are of central concern to, and shared among, all stakeholders. Both categories might therefore be useful in re-ordering the priority list to increase the effectiveness and efficiency of interventions.

The following example shows how the system model can support the process of identifying and structuring interventions. The example is taken from the project, where many countries identified success factor 'E. Matching work opportunities and learners' individual wishes and expectations', among others, as an area that needs further attention. This factor is part of the learners' pattern.

Due to the complexity of the visual representation, it is difficult to work with the whole pattern. The success factor of interest is therefore 'cut out' of the pattern, keeping only those other success factors that either *directly influence* or are *directly influenced by* the selected success factor. In Figure 8 only the relevant factors and inter-relationships are visible.

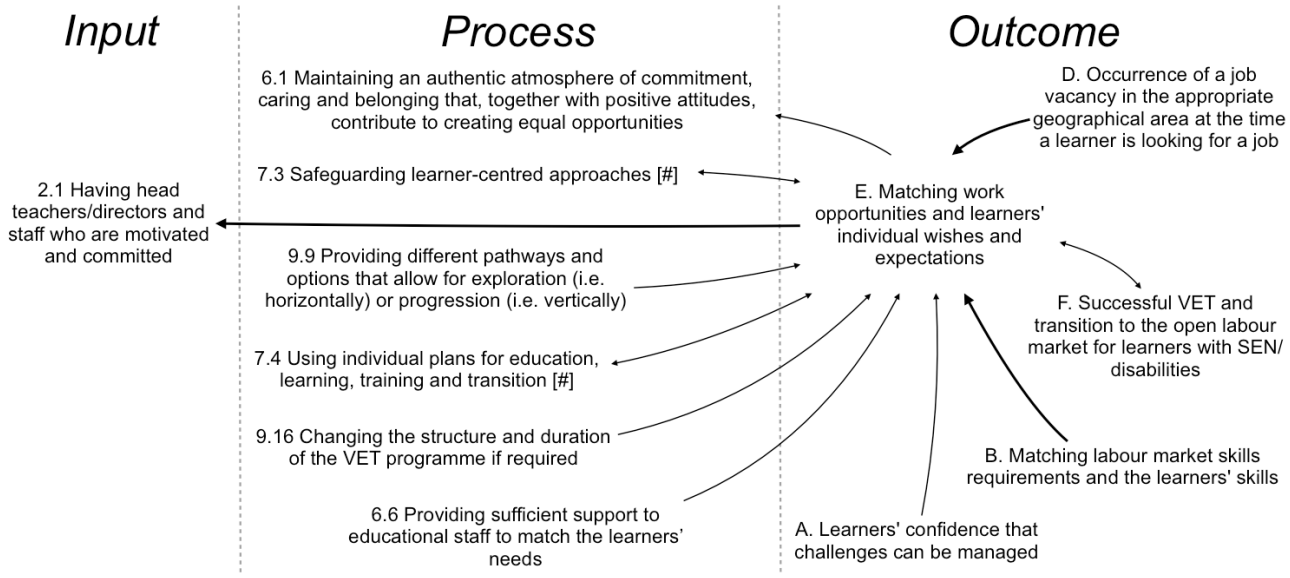


Figure 8 Success factor E and all other success factors that directly influence or are influenced by it (Learners' pattern)

The factors that are influenced by the selected success factor will be used subsequently (see sub-section 6.3), but in this first step we will focus only on those success factors that have a direct impact on the selected factor. Consequently, Figure 8 can be further simplified by deleting those success factors with an arrow originating from success factor E and transforming bidirectional arrows into unidirectional arrows (see Figure 9).

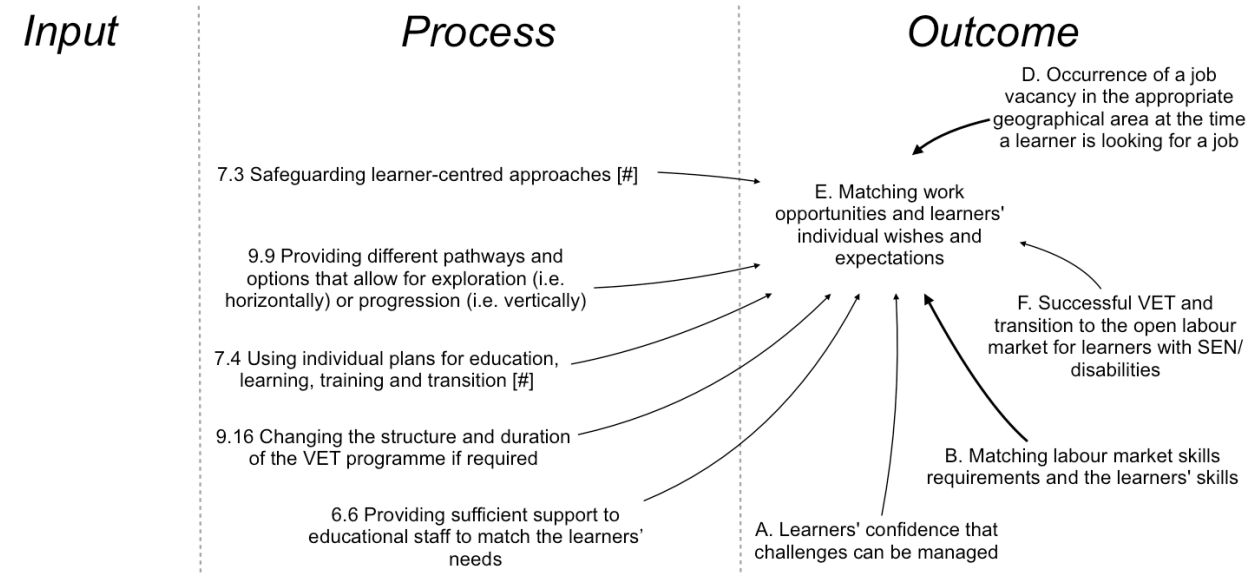


Figure 9 Success factor E and all success factors influencing it (Learners' pattern)

All the success factors listed in Figure 9 contribute to matching work opportunities and learners' individual wishes and expectations (E). They are therefore considered to be areas for potential intervention that will impact upon success factor E. In this particular case, interventions could focus on improvements to one or more of these influencing factors, e.g. on improving learner-centred approaches (7.3) or on better support to educational staff to match learners' needs (6.6). In this example, two success factors are marked with a hash symbol (#), indicating that they are *critical* factors. This type of factor is key to a system and can influence numerous other factors within it. Hence, such factors should be treated with additional care, as they have the potential to impact upon the whole system immediately, thoroughly and positively or negatively – or both at the same time.

While active or critical factors are characterised by their potential impact upon the whole system, the strength of each link between two success factors is another level to be considered in this process. Experts' judgement on the impact intensity of any link between success factors allowed for a distinction between *medium* impact and *strong* impact. This distinction of impact intensity is visually expressed by two types of arrows, where one is thicker than the other, indicating the strength of the expected impact. In the selected example, factors B and D are factors considered to have a strong impact.

In consequence, recommendations based upon the VET system model would need to:

- highlight all success factors that directly influence the selected success factor;
- indicate active or critical factors with the potential to impact more effectively on the whole system; and

- point out those factors which were considered to have the highest impact on the selected factor.

It must be highlighted that interventions should not be limited to the set of success factors identified in the visual representation of the VET system model. There are potentially many more aspects that can contribute to improving selected success factors. Some of them are already listed in the complete list of success factors (bear in mind that the visual model contains just a sub-set of all identified success factors), while others are specific to a certain VET environment and are therefore not part of the VET project outcomes which looked at commonalities between examples.

6.3 Guidance for monitoring

The implementation of interventions always requires careful *monitoring* to establish whether or not these interventions have the intended impact. Managing policy implementation therefore requires attention to the essential parts of the VET system and any qualitative or quantitative developments. Changes in parts of the system need to be identified and the extent to which they are caused by interventions or other (external) factors needs to be understood.

However, it is difficult to monitor a whole VET system effectively and efficiently. The complexity of such an endeavour has been discussed in another Agency project (European Agency for Development in Special Needs Education, 2011). In consequence, a selection of essential *indicators* is required to gain an overview of the whole system.

In searching for these indicators during the study visits, it was striking that few examples were able to present indicators other than basic quantitative data relating to learners' participation in courses, their completion of courses or their finding employment within a certain timeframe. The means of assessing the achievement of stated outcome success factors in practice are often very basic and cannot adequately address these complex concepts. For example, if one indicator relates to the number of practical work exposures, an increase of the indicator does not necessarily highlight an improvement. 'More' in this case is not necessarily 'better', and a maximisation strategy for this indicator will therefore not lead to improved system performance.

At the same time, it is unlikely that each intervention is monitored only by its direct impact on the VET system's ultimate aim, namely successful VET and transition to the open labour market. So many aspects impact upon this ultimate aim, and so many factors are undergoing change during any observation period, that it is methodologically impossible to unambiguously attribute any change solely to one intervention.

Thus a key question in the process of setting up suitable intervention remains: which indicators are suitable for monitoring whether the intervention has the intended impact?

Part of the answer is contained in the VET system model that describes a set of factors and their inter-relationships. Among other things, for each factor the model sets out other factors on which it has a direct impact. The model can be seen as a cascade of factors which directly or indirectly contribute to the VET system's ultimate aim. Monitoring the effects of interventions should be restricted to a single step in this cascade: to the factor upon which the intervention is focused and to the other factors *directly* influenced by this factor.

Figure 10 exemplifies this, again using success factor 'E. Matching work opportunities and learners' individual wishes and expectations'. This time, only factors directly influenced by factor E are included. If an intervention impacts on E, the effects can either be monitored directly (e.g. by interviewing learners and evaluating their perceived match of work opportunities to their own wishes and expectations) or indirectly, by monitoring the effects of the other directly linked factors.

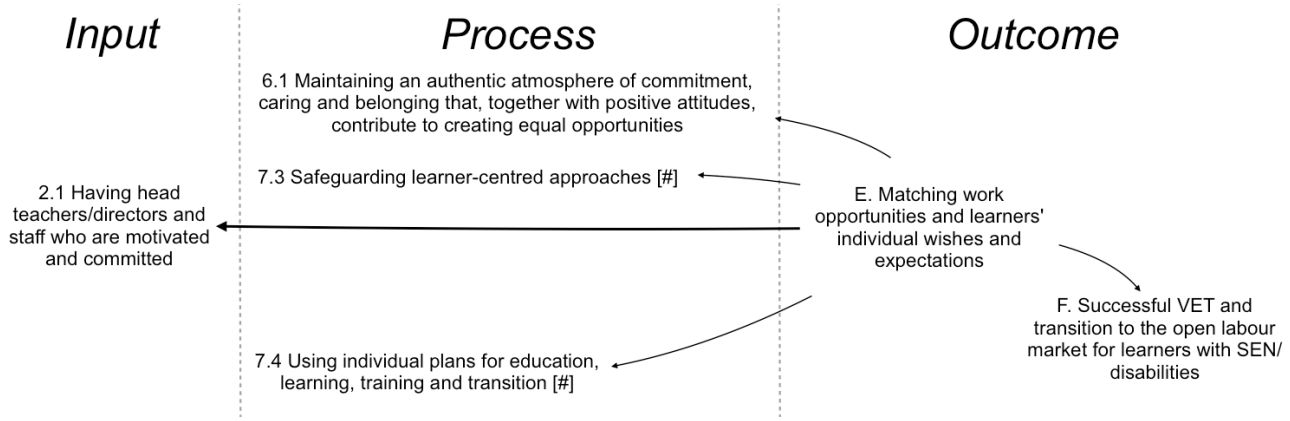


Figure 10 Success factor E and all success factors influenced by it (Learners' pattern)

In this particular case, indicators could include, for example:

- E's relevance on the head teachers'/directors'/staff's motivation and commitment via questionnaire surveys (2.1)
- E's impact E on the VET institution's atmosphere and on attitudes via observations or interviews (6.1)
- E's effect both on teachers and on learners with regard to following learner-centred approaches by measuring the frequency of process steps that regularly identify learners' individual wishes and expectations (7.3)

- The impact on the use of individual plans by analysing the structure of these plans with regard to eliciting learners' individual wishes and expectations and related plans to address them (7.4)
- E's relevance for successful VET and for maintaining a job on the open labour market by analysing employers' and learners' perceptions (F).

In conclusion, the VET model does not answer the question *which* specific indicators should be used, but it directs the VET system model user towards the areas for which indicators may be developed. Ideally, the monitoring activity can be attached with minimal additional effort to other data gathering activities already in place. For example, if VET institutions already monitor how former learners are proceeding in their jobs, some additional questions could be added that provide feedback on the specific issues that help to increase the whole VET system's performance.

With regard to the question of *which* specific indicators should be used, the following questions may be helpful:

- Which kind of impact is to be expected if the specific success factor is 'improved'?
- How can this impact be effectively monitored?
- Which indicators are most sensitive to changes to the impacting factor?
- If there is more than one way of monitoring the impact, which of the options can be integrated into existing monitoring tools (efficiency considerations), or which efforts are needed to monitor each option?
- Would monitoring of a suitable sample (instead of the whole), e.g. in the form of case studies or sampled surveys, suffice?
- How often should data be gathered to keep monitoring up-to-date?
- To what extent are changes to be expected within the monitoring period?

7. DISCUSSION

This methodology paper concludes with a discussion of the chosen methodology, split into advantages and limitations.

7.1 Advantages

The project employed a methodological approach that facilitated data gathering in 28 geographically dispersed study visit venues by small teams of experts, with a different team composition for each study visit. With only two major gatherings of all experts involved in the project activities, a fair compromise of collective tasks and activities that could be delegated to the (smaller) extended PAG was found.

In particular, the open method of data gathering and analysis (on the basis of *grounded theory*) allowed the development of hypotheses about *how* successful examples in VET work. To the best of the author's knowledge, it is the first time that a systems approach (based on the outcomes of data gathering and analysis) has been applied to gain a deeper understanding of successful VET.

Finally, the particular application of the systems approach elicited additional information that is of particular interest to policy- and decision-makers: which factors are strong or even critical levers that impact upon the whole system and which factors are weak levers? Which interventions have the potential to directly impact upon certain other factors? And where should indicators be placed to monitor whether interventions have the intended impact?

7.2 Limitations

On the other hand, the approach taken in this project may contain a certain bias that needs further discussion to enable the reader to better understand and interpret the outcomes in context.

The selection of project examples to be visited was undertaken by participating countries without the Agency's involvement. In particular, no assessment was performed after the selection with regard to the extent to which examples conformed to the agreed criteria/parameters. In this respect, the examples included in the project varied widely and the extent to which they conformed to the initial criteria was unknown. Furthermore, study visit hosts in the VET project knew beforehand that their example was selected as a 'good example'. For this reason, presentations given and insights provided during the visits often focused on the aspects that were thought to be the key success factors. The duration of the field visit (about 1.5 to 2 days on average) and the need to travel to different locations (e.g. ministries, schools, companies) limited the depth of insights. Therefore, while

the project gives overview information on successful VET practices in Europe, it cannot provide answers to all the questions that may arise.

The practical focus of the study visits was on the VET institution and its VET programmes. As a result, other factors – for example, the specific policy framework or financial support schemes for employers who hire learners with SEN – were not central and therefore are less evident in the set of success factors. While all participants agree that such areas are also highly relevant, a specific focus was necessary to make best use of the limited study visit time.

Furthermore, a number of factors that were identified in certain study visits were not taken into consideration when creating the system model. While it was necessary to disregard these factors in order to find similarities throughout the different examples and settings, the implications of this action also need to be discussed. The experts identified every one of the 68 factors as being relevant in itself, i.e. its relevance to each example in which it was found did not depend on how frequently it occurred in the study visits. Focusing on factors that appear in the majority of examples might exclude the very factors that are key to innovative approaches, but are not yet widespread or common practice in VET. Consequently, the project also analysed and discussed the factors that were not subject to the previously described process of setting up a VET system model. The outcomes of these discussions are provided in the main project report, where further conclusions are drawn. It is recommended that these conclusions should also be considered in the context of implementing or maintaining VET for learners with SEN/disabilities.

Another aspect for discussion relates to the analysis procedure. While all study visits and the validation of factors within the Cyprus conference were performed with the involvement of all experts (representing both the practical and the policy level), the establishment of the VET system model was based upon the work of a smaller group of experts in the extended PAG. For practical reasons, specialist literature on system design and analysis recommends that, in order to reach agreement, such work be carried out by a smaller group, provided that all relevant perspectives are represented. However, while the system model was set up by a small team, all results from this work were circulated to all experts for final validation.

To remedy a shortcoming of the study visits with regard to insufficient outcome-related factors, the project performed an assessment of all study visits. On this basis and with the professional experience of the PAG members, a set of five additional success factors was developed (factors A to E). However, a different group of experts might have come up with a different set of factors, leading to different elements and inter-relationships in the system model. Again, although developed by a small team, these results were also sent to the more than 50 experts involved in the project for validation and final agreement.

A final point for discussion is the decision to ignore a certain level of impact strength (here: level 1). This decision was taken after the extended PAG had drawn up the inter-relationships between all success factors and determined the specific impact strength (levels 1, 2 and 3) of each of the inter-relationships. As the definition of a level-1 impact strength was not strictly applied in the course of assessing all inter-relationships, there was a danger that taking all three impact levels into the further processing would blur the patterns that the project aimed to discover. A purely statistical analysis shows the inflationary use of the level-1 impact strength: the PAG identified 828 level-1 impact strength inter-relationships, i.e. each success factor had an average of 17 links to other success factors on this impact level alone. This detail would render a system model unusable, hence it was decided to give level-1 impact strength the same treatment as level-0, i.e. ignoring them in the system model. Consequently, only the 315 level-2 impact strength and the 27 level-3 impact strength inter-relations are reflected in the resulting VET system model (i.e. the system model consists of 49 success factors and 342 inter-relations between the success factors). However, it is unclear whether a different group of experts – or the same group of experts with more experience in using a systems approach – would have produced a different result, and what implications this would have for the VET system model.

REFERENCES

Bleicher, K., 2011. *Das Konzept Integriertes Management* [The Concept of Integrated Management]. Frankfurt/New York: Campus

Delahaye, B. L., 2002. 'The management of knowledge: A systems theory approach for vocational education and training', in J. Searle and D. Roebuck (eds.), *Proceedings of the 10th Annual International Conference on Post-compulsory Education and Training*. Brisbane: Australian Academic Press, 236–243

Dice, L. R., 1945. 'Measures of the Amount of Ecologic Association Between Species', *Ecology*, 26 (3), 297–302

European Agency for Development in Special Needs Education, 2009. *Development of a Set of Indicators – for inclusive education in Europe*. Odense, Denmark: European Agency for Development in Special Needs Education

European Agency for Development in Special Needs Education, 2011. *Participation in Inclusive Education – A Framework for Developing Indicators*. Odense, Denmark: European Agency for Development in Special Needs Education

Ferber, R., 2003. *Information Retrieval*. Heidelberg: dpunkt-Verlag. http://information-retrieval.de/irb/ir.html (Last accessed 15 June 2013)

Honegger, J., 2011. *Vernetztes Denken und Handeln in der Praxis* [Networked Thinking and Acting in Practice]. Zürich: Versus

Kickert, W., 1995. 'Steering at a Distance: A New Paradigm of Public Governance in Dutch Higher Education', *Governance: An International Journal of Policy and Administration*, 8 (1), January 1995, 135–157

Likar, B., 2007. 'Innovation in vocational education – ways of reaching the tip of the iceberg', *International Journal of Innovation and Learning*, 4(4), 323–341

Manning, C. and Schütze, H., 1999. *Foundations of Statistical Natural Language Processing*. Cambridge, MA: MIT Press

Silvern, L. C., 1967. *Systems Analysis and Synthesis Applied to Occupational Instruction in Secondary Schools*. http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED015676&ERICExtSearch_SearchType_0=no&accno=ED015676 (Last accessed 14 July 2013)

Sørensen, T., 1957. 'A method of establishing groups of equal amplitude in plant sociology based on similarity of species and its application to analyses of the vegetation on Danish commons', *Kongelige Danske Videnskabernes Selskab*, 5 (4), 1–34

Stafford Beer, A., 1959. *Cybernetics and Management*. London: English Universities Press

Stafford Beer, A., 1985. *Diagnosing the System for Organizations*. Chichester: Wiley

Organisation for Economic Co-operation and Development, 2010. *A systemic approach to educational research and innovation*. http://www.oecd.org/innovation/policyplatform/48136016.pdf (Last accessed 14 July 2013)

Vester, F., 1999. *Die Kunst vernetzt zu denken – Ideen und Werkzeuge für einen neuen Umgang mit Komplexität* [The Art of Interconnected Thinking: Tools and concepts for a new approach to tackling complexity]. Stuttgart: Deutsche Verlags-Anstalt

ANNEX 1 LIST OF EXPERTS

Country	Expert's name
Austria	Mr Dietmar Vollmann Ms Ursula Ortner
Belgium (Flemish speaking community)	Ms Inge Placklé Mr Thierry Jongen
Cyprus	Ms Maria Evripidou Mr Kostas Pistos
Czech Republic	Ms Vera Kovaříková Ms Lucie Procházková
Denmark	Mr Henrik Hedelund Ms Pia Cort
Estonia	Ms Meeli Murasov Ms Aile Nõupuu Ms Mari Tikerpuu
Finland	Ms Kaija Suorsa-Aarnio Ms Tarja Mänty
France	Mr Serge Ebersold Mr Rémy Leblanc
Germany	Mr Ulrich Krause Ms Margit Theis-Scholz
Greece	Mr Anastasios Asvestas Ms Chrysoula Stergiou
Hungary	Ms Katalin Simon
Iceland	Ms Ragnheiður Bóasdóttir Ms Thordis Olafsdóttir
Ireland	Mr Fionnbarra O'Murchu Ms Emer Ring Mr Rory O'Sullivan
Latvia	Ms Tatjana Truscelova-Danilova Ms Ilva Berzina
Lithuania	Ms Liuda Radzeviciene Ms Egle Zybartiene
Luxembourg	Mr Fernand Sauer Ms Marie-Paule Muller
Malta	Mr Vincent Borg Ms Maria Ciappara
Netherlands	Mr Freerk Steendam Mr Jeroen Stok
Norway	Ms Liv Frilseth Mr Bjørn Baugstø
Poland	Mr Witold Cyron

Portugal	Mr Luis Capucha Mr Edgar Pereira Mr Pedro Mateira
Slovenia	Ms Bernarda Kokalj Ms Frančiška Al-Mansour
Spain	Ms María Eugenia Caldas Ms Amparo Marzal
Sweden	Ms Marie Törn Ms Eva Valtersson
Switzerland	Ms Susanne Aeschbach Ms Myriam Jost-Hurni Mr Rene Stalder
United Kingdom (England)	Ms Linda Jordan Ms Sharon Gould
United Kingdom (Northern Ireland)	Ms Shirley Jones
United Kingdom (Wales)	Mr Stephen Beyer
Project Advisory Group	Mr Preben Siersbaek (Denmark) Ms Lucie Bauer (Austria) Mr Berthold van Leeuwen (Netherlands) Ms Regina Labiniene (Lithuania) Ms Anabel Corral Granados (Agency) Ms Victoria Soriano (Agency) Ms Mary Kyriazopoulou (Agency) Mr Harald Weber (Agency)
Senior external experts	Ms Maria Hrabinska (Cedefop) Mr Serge Ebersold (INSHEA)

ANNEX 2 LIST OF ALL INPUT, STRUCTURE AND PROCESS FACTORS

All the factors identified during the study visits are listed in this Annex. Their explanations (provided below each factor) are based exclusively on the visits and the experts' view of the examples. The factors do not refer to theoretical concepts, but rather to observations made in some or all of the 26 participating countries.[10] Factors observed in many of the study visits that became part of the VET system model are marked with an asterisk (*).

1 *Having high-quality infrastructure (e.g. building, transport, teaching and training materials)*

The physical environment of the school/VET setting, and the companies where learners carry out their practical training, have been adapted to the needs of people with SEN/disabilities. High-quality equipment and training materials (up-to-date technology, use of IT) are available.

2.1 *Having head teachers/directors and staff who are motivated and committed**

Head teachers/directors and staff are highly motivated, committed, dedicated and sometimes open in expressing their enthusiasm.

2.2 *Having a school director with effective leadership**

Leadership from the school director is effective and both appreciated and respected. Distributive leadership is visible and works well.

2.3 *Having highly qualified teachers, staff and support personnel**

Staff are highly qualified, i.e. they have formal university-level qualifications, a vocational qualification and/or industry-based experience, with on-going/in-service or further training possibilities and human resources/professional development.

2.4 *Having teachers qualified in SEN pedagogy*

Teachers are qualified to teach learners with SEN/disabilities, in addition to having a formal qualification in specific subjects/technical vocations.

2.5 *Having further training/education opportunities for all staff, including teachers**

On-going/in-service or further training opportunities are offered to all educational and support staff, including teachers.

2.6 *Having multi-disciplinary teams**

[10] The numbering of the factors will make it easier to identify the factors in this paper.

Multi-disciplinary teams are set-up to include professionals such as teachers, trainers, social workers, psychologists, occupational therapists and support staff.

*2.7 Having a suitable teacher–learner ratio**

Small class sizes are used because they are positive for learning. There are additional staff in the classroom, besides the class teacher, where necessary.

*2.8 Having a suitable support staff–learner ratio**

Sufficient support staff are available, co-ordinated at school level, to provide a broad range of support, e.g. assistants, carers and managers, as well as professionals who assist and support learners during their practical training in the workplace.

2.9 Having staff with labour market experience

Staff that work in the school/VET setting have previous work experience in companies, industries, etc.

2.10 Having continuity of staff/low turnover rate

A stable and permanent team of staff with a low turnover rate helps to build sustainable networks and connections to employers.

*3.1 Having established/formalised partnerships, co-operation and networking structures with stakeholders and services**

Partnerships are established/formalised and co-ordinated (as opposed to ad-hoc, co-incidental and fully dependent on contact between a few individuals). There are co-operation and networking structures with stakeholders and services, including employment services, financial providers, youth guidance centres, youth care, local community, voluntary organisations, etc.

3.2 Having collaboration/co-ordination/partnership structures between the VET institution, ministries and employers (national/local level)

A co-ordination service/unit operates: at ministry level to co-ordinate the school/VET setting with the ministry and employers (e.g. by providing job coaching support); at municipality level to monitor and co-ordinate activities; and at the school/VET setting level to co-ordinate with, for example, a Vocational Training Board for practical training.

*3.3 Having a formal and strong strategy of co-operation between VET institutions and parents, including parent participation**

There is a strategy to encourage parents' active involvement in their children's learning process, based upon formal co-operation and dialogue

with parents as equal partners, to ensure that parents have a say in which company their child attends.

3.4 Having collaboration structures between special and mainstream VET schools (e.g. special teachers teaching/supporting teachers in mainstream, mutual activities)

Special VET schools and mainstream VET schools collaborate with each other and with training organisations to provide VET for learners with SEN/disabilities, e.g. through special teachers teaching/supporting mainstream teachers or vice versa.

3.5 Having established collaboration structures among VET services, support services and ministries at national level

Co-operation and partnership between service providers and different ministries concerned with feedback on policy development at national level is established.

4.1 Having pre-vocational preparation at school

Pre-vocational programmes are available at lower-secondary school level.

*4.2 Having established co-operation structures with local companies for practical training and/or jobs after graduation**

There is a networking structure with a pool of employers for close co-operation with regard to learners' practical training and/finding employment after graduation.

*4.3 Having established structures and procedures that ensure courses, assessments and certificates are tailored to current and future labour market needs**

VET programmes/courses are reviewed periodically, both internally (e.g. by validating them against recent labour market analyses) and/or externally (e.g. national agencies) in order to adapt to future skills needs. This potentially entails the involvement of labour market representatives in school procedures (e.g. examinations) and/or structures (e.g. school boards).

*4.4 Having staff (e.g. job coaches, career counsellors, mentors) and resources permanently available throughout transition and work**

Formal job coaching programmes, career guidance or support services, including after-care and preparation of employers, are permanently available for learners with SEN/disabilities searching for a job in the open labour market and when they first find employment.

4.5 Having financial compensation available to employers on a permanent basis, i.e. as long as necessary, to account for the reduced work ability of employees with SEN/disability

Financial compensation is permanently available, e.g. through wage subsidies by national or local authorities.

4.6 Having special systems that lead learners (at least temporarily) back to mainstream systems to avoid permanent tracking

Learners with SEN/disabilities are led by the special system back to mainstream at certain points (e.g. the labour agency assesses their readiness for apprenticeship or their need for a pre-vocational course), to avoid being permanently fixed in one educational track.

*5.1 Having implemented a national/federal legal framework on inclusive education in secondary/upper-secondary education**

A national/federal legal framework on inclusive education in secondary/upper-secondary education has been implemented with: national goals on inclusive education; provisions relating to learners with SEN/disabilities; decentralisation of responsibilities (regional, local level); more learner-centred approaches and flexibility to deal with diversity and learners with SEN/disability across the country.

5.2 Having implemented a system that ensures the right of learners with SEN/disability, who cannot follow mainstream upper-secondary/VET education to tailor-made or special upper-secondary education (legal framework on 'education for all')

Policies developed on the basis of 'education for all' give learners with SEN/disabilities (who cannot follow mainstream upper-secondary/VET education) the right to tailor-made or special upper-secondary/VET education.

5.3 Having implemented a legal framework on disability that ensures civil rights and delegation of respective responsibilities to local and regional level, allowing innovation and co-operation between the relevant stakeholders in VET

The legal framework on disability, equal opportunities and/or anti-discrimination ensures civil rights (with regard to employment, education, accessibility, citizenship, etc.) and delegation of respective responsibilities to local and regional level, allowing innovation and co-operation between the relevant stakeholders in VET.

5.4 Having implemented a legal framework on employment for people with SEN/disabilities (directive, national strategy) in which the inclusion of learners

with SEN/disabilities in the labour market is the priority to ensure: emphasis on support for the employment of people with SEN/disabilities; focus on stakeholder co-operation; active policies to promote employment at local level

Policy gives priority to the inclusion of learners with SEN/disabilities in the open labour market with an emphasis on additional support; active policies promote employment at the local level; policy promotes the link between VET, practical training of learners in companies and support for employment after graduation.

5.5 *Having implemented a legal framework for required support to schools (that take learners with SEN/disabilities) and/or to learners and parents**

Policy provides for adequate support (e.g. additional funding, higher staff–learner ratios, support staff, multi-disciplinary teams, adapted educational materials, school companions, tax relief, access to support services, etc.) to schools that take learners with SEN/disabilities and to learners with SEN/disabilities and their parents.

5.6 *Having implemented a legal framework allowing the VET institutions to offer different levels of apprenticeships with different curricula leading to different qualification levels**

Flexibility in policy allows the VET settings to offer different levels of VET programmes with different curricula, leading to different qualification levels, in order to respond to individual needs. This includes opportunities to switch between prolonged and reduced versions of apprenticeships and/or to a different VET programme.

6.1 *Maintaining an authentic atmosphere of commitment, caring and belonging that, together with positive attitudes, contributes to the creation of equal opportunities**

Staff believe in learners' abilities and see opportunities rather than challenges. Their aim is to make all learners feel more confident and assertive in what they do. They empower the learners in order to raise their self-esteem and develop their personalities.

6.2 *Safeguarding the positive effects of multi-disciplinary teams and of co-ordinated teamwork**

Multi-disciplinary teams have clear roles (teachers, physiotherapists, psychologists, school counsellors, speech therapists, trainers, career guidance, etc.) and a teamwork approach and co-operate with a high level of internal communication (peer coaching, informal discussions, collaborative problem solving, etc.) and external communication with other services.

*6.3 Offering further training opportunities and staff development to ensure quality in education**

The VET setting offers in-service training for all teachers and support staff in an on-going process in the context of professional development, including peer teaching, seminars on SEN, subject-based seminars, etc.

*6.4 Adapting pedagogical methods and techniques at school and in companies**

Teachers/trainers are able to adapt their pedagogical methods to match the employers' needs and have enough resources for innovative individual work and support.

6.5 Staff maintaining contacts with companies for practical training and jobs

Staff build good relationships and networks with employers at local level for learners' practical training and finding employment after graduation.

*6.6 Providing sufficient support to educational staff to match the learners' needs**

Sufficient methodological, technical and psychological support is provided to educational staff to adapt the curriculum and materials to learners with SEN/disabilities.

*7.1 Maintaining a good balance between theoretical/academic subjects and practical training**

The VET programmes provide a good balance between theoretical/academic subjects and practical training/learning-through-doing.

*7.2 Focusing on hands-on/practical/life-like learning approaches that also include theoretical/academic subjects**

The focus is on learning-through-doing/learning-on-the-job approaches (as opposed to theoretical approaches), with core subjects integrated into projects.

*7.3 Safeguarding learner-centred approaches**

A learner-centred approach tailors pedagogical methods and materials, the curriculum, assessment methods and goals, etc., to individual needs.

*7.4 Using individual plans for education, learning, training and transition**

Individual curricula, individual education/learning/training plans, individual transition plans, etc., are developed and implemented.

*7.5 Accounting for the development of social skills and well-being**

Appropriate attention is given to the development of social skills and well-being, e.g. personal and social skills, rights, duties of citizenship, activities of daily living (ADL).

*7.6 Using innovative teaching methods and approaches**

Innovative teaching methods and approaches are implemented, e.g. peer learning, role-plays, learning through authentic tasks, using games for certain topics (e.g. maths).

*7.7 Safeguarding flexibility in VET opportunities/courses to allow progress from one level to another**

There is flexibility in VET opportunities/courses so that learners can start in a lower level programme and can move to a higher level programme either before or after graduation.

*7.8 Supervising practical training in companies and offering supported employment models with progressively decreasing support intensity**

Learners are assisted/supported by staff (teachers, trainers, assistants, job coachers, mentors, etc.) both during their practical training in companies and also after graduation. Young people who have found a paid job are supported at work by job coaches/assistants through the supported employment model, with a progressive decrease in support intensity.

*7.9 Supporting learners and employers during the transition phase into the open labour market**

Career counsellors/officers inform and guide learners regarding employment possibilities, facilitate and support contact with employers, provide support with job applications, provide information and support to employers and provide additional support needed by young people, etc.

*7.10 Providing follow-up activities to maintain learners' employment in companies**

Follow-up support activities address the needs of young people and employers in order to maintain a learner's employment once they find it.

7.11 Offering vocational training (courses, programmes and work experience) that involves real work with real customers/clients

Work is carried out in the VET programme on clients' orders, etc., with real contact with clients and customers.

*7.12 Focusing on learners' capabilities**

Learners with SEN/disabilities are empowered, focusing on their abilities: what they *can* do, NOT what they *cannot* do. This is based upon the strong

belief of both learners and teachers in the learners' strengths and possibilities, as a means of increasing self-esteem and self-confidence.

*8.1 Joint working, strong collaboration, good networking, an open spirit of co-operation**

There is good networking and collaboration with different stakeholders at local level including: municipality, employment service, support services, chambers of commerce, non-governmental organisations, voluntary organisations, parents, trade unions, etc.

*8.2 Exchanging and co-operating with parents on an equal footing**

Good links exist and parents are actively involved as equal partners.

*8.3 Showing positive attitudes of stakeholders and learners/teachers**

Employers have positive experiences with the trainees and employees with SEN/disabilities; parents have positive experiences with the VET and employment providers; learners are satisfied with and conscious of the support they receive; funding providers recognise value for money.

*8.4 Safeguarding connections with local employers/companies for practical training and job opportunities based upon trust and past experiences**

Resilient (i.e. long-standing, well-established and stable) connections result in a high percentage of learners obtaining a job with the company in which they carried out their practical training, because the companies feel confident from past experience that they can receive the support needed.

9.1 Developing a differentiated range of qualification levels

Different VET programmes and certificates are available, targeting the acquisition of different skills and competences, with options for accreditation of achievement of individually defined goals.

*9.2 Compiling portfolios and awarding certificates/documents on achievements and skills**

Documents/portfolios are kept on the skills and achievements and sometimes also on the support required in the workplace.

9.3 Awarding the same certificates as for non-SEN/non-disabled peers

Learners receive an equivalent education; certificates are the same as for non-SEN/non-disabled peers, even if the duration was longer or additional help was granted.

9.4 Certifying work- and life-related skills in addition to official certificates

Different levels of certificates can be achieved by individual learners, with the support and acknowledgement of local employers.

*9.5 Developing and implementing individualised and flexible curricula**

A flexible approach allows for the development and implementation of individual curricula.

9.6 Implementing reverse inclusion

VET courses and services and the VET centre's facilities are open to non-SEN/non-disabled peers.

9.7 Focusing on needs-based instead of diagnosis-based provision

Special needs are defined in a flexible and open way and provision is based upon particular needs (e.g. reducing dropout).

9.8 Strength-based co-operation between mainstream and special provision

Special schools and mainstream schools collaborate and support each other to reduce dropouts.

*9.9 Providing different pathways and options that allow for exploration (i.e. horizontal) or progression (i.e. vertical)**

There are: options to improve a qualification, but also to improve grades; opportunities for learners to change their mind and to switch to a different programme; options to choose between different professions and to have an academic and/or professional certificate; options to make use of an adapted curriculum.

*9.10 Dropout reduction strategy**

The school takes preventive educational action against dropouts in close co-operation with the local social services and develops measures so that dropouts find new alternatives.

*9.11 Committing all stakeholders to quality assurance and improvement strategies**

Programmes are implemented and certified to improve VET quality and continuously improve learners' preparation for the real labour market.

9.12 Ensuring that learners, families and all other stakeholders are aware of and understand learning possibilities

Information on learning possibilities is effectively presented and disseminated, e.g. by providing easy-to-understand information sheets with various internet links to job portals, information on finding other opportunities and key dates for the year.

9.13 Ensuring that schools have clear inclusive policies in practice

Equality is an integral part of practice and can be observed in the interaction between teachers and learners, based upon a clear inclusive policy at school level with strategies for implementation and monitoring of progress.

9.14 Implementing a no-risk policy/return policy

Learners can return to the VET setting if their experiences of work do not go as hoped (no risk policy).

9.15 Implementing policies in each school equally

National policy regarding VET quality is implemented equally in each school.

*9.16 Changing the structure and duration of the VET programme if required**

The VET setting is flexible, ensuring that the structure and duration of the VET programmes respond to learners' needs, e.g. via an extension of the course duration, longer internships in preparatory classes, an emphasis on practical courses rather than theoretical courses, etc.

*9.17 Assessing learners prior to the start of courses in order to tailor a VET programme to the individual**

Learners take part in assessment schemes prior to starting the VET programme so that the most appropriate VET programme is selected, which matches learners' abilities and wishes.

*9.18 Supervised practical phases that take place sufficiently in advance of school leaving are obligatory/mandatory for all learners**

All learners take part in obligatory/mandatory and supervised exposure to work; short practical training in the open labour market; long-lasting (e.g. 24 weeks) practical training to check their capabilities and establish connections with future employers.

ANNEX 3 PROCEDURE FOR AND SPECIFIC OUTCOMES OF THE ANALYSIS OF THE CORRELATIONS BETWEEN ALL FACTORS

The key task is to compare vectors of values. Vector x represents the values for each study visit for success factor x, and vector y represents the values for each study visit for success factor y. The question to be answered is: how similar or dissimilar are those two vectors? One useful index is the Sørensen-Dice coefficient to statistically compare the similarity of two vectors (Sørensen, 1957; Dice, 1945).

According to Ferber (2003), for vectors with real values the Sørensen-Dice coefficient is:

[1] $$\frac{2\cdot \sum_{k=1}^{n}\left(weight_{xk}\cdot weight_{yk}\right)}{\sum_{k=1}^{n} weight_{xk}+\sum_{k=1}^{n} weight_{yk}}$$

Because in this case the vectors consist only of binary values (i.e. success factor was observed in this study visit: yes/no), this formula can be simplified as follows (Manning and Schütze, 1999):

[2] $$\frac{2\cdot |X\cap Y|}{|X|+|Y|}$$

with $|X|$ as the number of non-zero values in vector x and $|Y|$ the number of non-zero values in vector y and $|X\cap Y|$ as the number of non-zero values in both vectors at the same position. The factor 2 stretches the coefficient such that values lie between 0 and 1. For further simplification of the calculation, 'factor was observed' was coded with 1 and 'factor was not observed' was coded with 0. Table 2 contains the correlation matrix resulting from this.

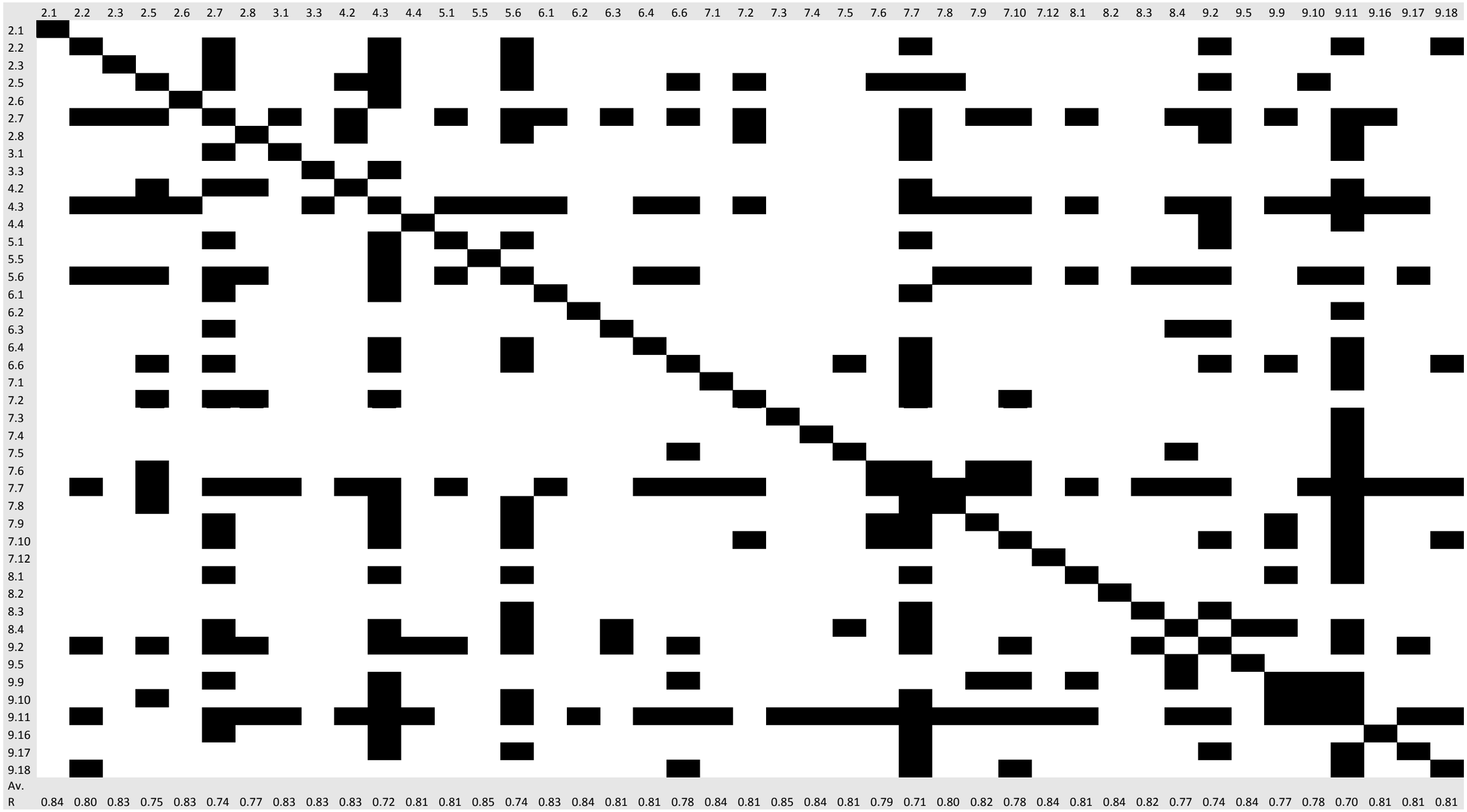
In order to determine a threshold value below which a calculated correlation should be ignored (i.e. not considered for further analysis by the PAG), the coefficient of determination R2 was used. The project team decided that the explained variance (compared to the total variance) should be larger than 0.5, thus a minimum correlation of 0.75 (R2 = 0.56) will suffice. By making use of this threshold, 286 out of 2,304 possible combinations of success factors (including the output/outcome-related factors) require no further investigation by the PAG.

Table 2 contains correlation values of the selected success factors in relation to each other success factor. The factors are listed with their respective number; please refer to Annex 2 for the full factor descriptions.

Table 2 Correlation matrix for the selected success factors

	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.1	3.3	4.2	4.3	4.4	5.1	5.5	5.6	6.1	6.2	6.3	6.4	6.6	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	7.10	7.12	8.1	8.2	8.3	8.4	9.2	9.5	9.9	9.10	9.11	9.16	9.17	9.18
2.1		0.88	0.94	0.82	0.90	0.77	0.81	0.88	0.94	0.89	0.76	0.87	0.87	0.98	0.76	0.89	0.90	0.87	0.84	0.83	0.90	0.85	0.88	0.90	0.83	0.89	0.78	0.82	0.87	0.86	0.92	0.91	0.98	0.96	0.84	0.80	0.92	0.80	0.82	0.78	0.84	0.86	0.88
2.2	0.88		0.86	0.77	0.82	0.72	0.86	0.84	0.81	0.86	0.70	0.83	0.88	0.86	0.65	0.90	0.83	0.78	0.85	0.89	0.83	0.76	0.80	0.83	0.79	0.75	0.72	0.82	0.88	0.97	0.80	0.92	0.86	0.93	0.84	0.70	0.84	0.75	0.77	0.72	0.85	0.92	0.74
2.3	0.94	0.86		0.79	0.92	0.74	0.78	0.89	0.87	0.91	0.73	0.84	0.89	0.96	0.73	0.87	0.92	0.84	0.86	0.85	0.88	0.83	0.86	0.92	0.81	0.86	0.75	0.88	0.84	0.83	0.86	0.88	0.92	0.89	0.81	0.82	0.94	0.82	0.79	0.75	0.82	0.84	0.81
2.5	0.82	0.77	0.79		0.84	0.70	0.79	0.77	0.79	0.74	0.68	0.76	0.76	0.84	0.68	0.79	0.81	0.86	0.78	0.70	0.81	0.74	0.78	0.81	0.77	0.68	0.65	0.70	0.81	0.79	0.78	0.75	0.84	0.86	0.77	0.68	0.77	0.78	0.70	0.81	0.78	0.75	0.82
2.6	0.90	0.82	0.92	0.84		0.80	0.79	0.90	0.88	0.83	0.70	0.89	0.85	0.92	0.83	0.83	0.96	0.89	0.87	0.76	0.92	0.88	0.90	0.96	0.86	0.78	0.76	0.80	0.85	0.79	0.90	0.80	0.92	0.85	0.77	0.78	0.90	0.83	0.80	0.76	0.83	0.80	0.90
2.7	0.77	0.72	0.74	0.70	0.80		0.84	0.73	0.84	0.70	0.79	0.81	0.71	0.76	0.73	0.70	0.85	0.71	0.78	0.70	0.81	0.74	0.83	0.85	0.86	0.83	0.70	0.75	0.71	0.74	0.87	0.65	0.80	0.76	0.67	0.68	0.82	0.73	0.75	0.65	0.68	0.75	0.82
2.8	0.81	0.86	0.78	0.79	0.79	0.84		0.76	0.83	0.73	0.78	0.85	0.80	0.79	0.67	0.78	0.80	0.80	0.82	0.86	0.76	0.68	0.82	0.80	0.81	0.77	0.74	0.79	0.80	0.89	0.82	0.79	0.84	0.85	0.76	0.56	0.81	0.77	0.79	0.74	0.77	0.84	0.76
3.1	0.88	0.84	0.89	0.77	0.90	0.73	0.76		0.85	0.94	0.76	0.87	0.83	0.90	0.80	0.89	0.90	0.87	0.84	0.83	0.94	0.85	0.92	0.90	0.88	0.80	0.73	0.86	0.91	0.81	0.88	0.91	0.90	0.83	0.88	0.84	0.83	0.76	0.86	0.68	0.84	0.82	0.83
3.3	0.94	0.81	0.87	0.79	0.88	0.84	0.83	0.85		0.83	0.73	0.89	0.80	0.92	0.77	0.83	0.88	0.84	0.91	0.85	0.88	0.87	0.90	0.88	0.85	0.86	0.75	0.84	0.89	0.83	0.94	0.84	0.92	0.89	0.86	0.77	0.89	0.77	0.88	0.75	0.82	0.84	0.89
4.2	0.89	0.86	0.91	0.74	0.83	0.70	0.73	0.94	0.83		0.78	0.80	0.89	0.92	0.77	0.96	0.88	0.84	0.82	0.85	0.92	0.87	0.90	0.88	0.85	0.86	0.70	0.93	0.89	0.83	0.86	0.93	0.88	0.84	0.86	0.86	0.89	0.77	0.84	0.70	0.91	0.88	0.81
4.3	0.76	0.70	0.73	0.68	0.70	0.79	0.78	0.76	0.73	0.78		0.75	0.70	0.74	0.72	0.73	0.76	0.80	0.62	0.69	0.76	0.68	0.82	0.76	0.86	0.87	0.74	0.74	0.65	0.67	0.82	0.74	0.79	0.75	0.65	0.67	0.76	0.72	0.68	0.69	0.72	0.68	0.76
4.4	0.87	0.83	0.84	0.76	0.89	0.81	0.85	0.87	0.89	0.80	0.75		0.82	0.85	0.79	0.80	0.90	0.86	0.84	0.82	0.86	0.80	0.92	0.90	0.87	0.79	0.82	0.81	0.82	0.80	0.92	0.81	0.89	0.82	0.83	0.70	0.87	0.79	0.81	0.67	0.79	0.81	0.91
5.1	0.87	0.88	0.89	0.76	0.85	0.71	0.80	0.83	0.80	0.89	0.70	0.82		0.89	0.74	0.93	0.90	0.82	0.84	0.82	0.86	0.80	0.88	0.90	0.83	0.79	0.72	0.86	0.86	0.85	0.83	0.86	0.85	0.86	0.78	0.74	0.91	0.84	0.76	0.77	0.88	0.90	0.78
5.5	0.98	0.86	0.96	0.84	0.92	0.76	0.79	0.90	0.92	0.92	0.74	0.85	0.89		0.78	0.92	0.92	0.89	0.87	0.81	0.92	0.88	0.90	0.92	0.86	0.87	0.76	0.84	0.89	0.84	0.90	0.89	0.96	0.94	0.82	0.83	0.94	0.83	0.84	0.81	0.87	0.84	0.86
5.6	0.76	0.65	0.73	0.68	0.83	0.73	0.67	0.80	0.77	0.77	0.72	0.79	0.74	0.78		0.77	0.83	0.84	0.71	0.63	0.83	0.82	0.89	0.83	0.89	0.76	0.79	0.73	0.74	0.62	0.85	0.68	0.78	0.70	0.65	0.67	0.80	0.76	0.73	0.63	0.81	0.68	0.84
6.1	0.89	0.90	0.87	0.79	0.83	0.70	0.78	0.89	0.83	0.96	0.73	0.80	0.93	0.92	0.77		0.88	0.84	0.86	0.85	0.92	0.87	0.90	0.88	0.85	0.82	0.70	0.88	0.93	0.88	0.86	0.93	0.88	0.89	0.86	0.82	0.89	0.82	0.84	0.75	0.95	0.93	0.81
6.2	0.90	0.83	0.92	0.81	0.96	0.85	0.80	0.90	0.88	0.88	0.76	0.90	0.90	0.92	0.83	0.88		0.86	0.88	0.77	0.96	0.88	0.94	1.00	0.90	0.83	0.77	0.85	0.86	0.80	0.94	0.81	0.92	0.86	0.78	0.83	0.94	0.88	0.81	0.73	0.83	0.85	0.90
6.3	0.87	0.78	0.84	0.86	0.89	0.71	0.80	0.87	0.84	0.84	0.80	0.86	0.82	0.89	0.84	0.84	0.86		0.79	0.77	0.86	0.84	0.92	0.86	0.87	0.79	0.82	0.81	0.82	0.75	0.88	0.81	0.89	0.82	0.73	0.74	0.87	0.84	0.81	0.82	0.88	0.76	0.87
6.4	0.84	0.85	0.86	0.78	0.87	0.78	0.82	0.84	0.91	0.82	0.62	0.84	0.84	0.87	0.71	0.86	0.88	0.79		0.89	0.88	0.86	0.85	0.88	0.80	0.76	0.68	0.88	0.93	0.87	0.85	0.83	0.83	0.84	0.85	0.76	0.89	0.81	0.88	0.74	0.86	0.88	0.80
6.6	0.83	0.89	0.85	0.70	0.76	0.70	0.86	0.83	0.85	0.85	0.69	0.82	0.82	0.81	0.63	0.85	0.77	0.77	0.89		0.77	0.75	0.79	0.77	0.73	0.79	0.71	0.92	0.87	0.91	0.79	0.92	0.81	0.82	0.89	0.68	0.83	0.74	0.81	0.65	0.84	0.92	0.73
7.1	0.90	0.83	0.88	0.81	0.92	0.81	0.76	0.94	0.88	0.92	0.76	0.86	0.86	0.92	0.83	0.92	0.96	0.86	0.88	0.77		0.92	0.94	0.96	0.90	0.83	0.73	0.85	0.90	0.80	0.94	0.85	0.92	0.86	0.83	0.88	0.90	0.83	0.85	0.73	0.88	0.85	0.90
7.2	0.85	0.76	0.83	0.74	0.88	0.74	0.68	0.85	0.87	0.87	0.68	0.80	0.80	0.88	0.82	0.87	0.88	0.84	0.86	0.75	0.92		0.90	0.88	0.85	0.82	0.70	0.84	0.84	0.73	0.90	0.79	0.83	0.80	0.76	0.86	0.89	0.82	0.88	0.75	0.91	0.79	0.89
7.3	0.88	0.80	0.86	0.78	0.90	0.83	0.82	0.92	0.90	0.90	0.82	0.92	0.88	0.90	0.89	0.90	0.94	0.92	0.85	0.79	0.94	0.90		0.94	0.96	0.85	0.79	0.87	0.88	0.77	0.96	0.83	0.90	0.83	0.80	0.81	0.92	0.85	0.87	0.74	0.89	0.83	0.92
7.4	0.90	0.83	0.92	0.81	0.96	0.85	0.80	0.90	0.88	0.88	0.76	0.90	0.90	0.92	0.83	0.88	1.00	0.86	0.88	0.77	0.96	0.88	0.94		0.90	0.83	0.77	0.85	0.86	0.80	0.94	0.81	0.92	0.86	0.78	0.83	0.94	0.88	0.81	0.73	0.83	0.85	0.90
7.5	0.83	0.79	0.81	0.77	0.86	0.86	0.81	0.88	0.85	0.85	0.86	0.87	0.83	0.86	0.89	0.85	0.90	0.87	0.80	0.73	0.90	0.85	0.96	0.90		0.84	0.78	0.82	0.83	0.76	0.92	0.77	0.86	0.83	0.74	0.76	0.88	0.80	0.82	0.73	0.84	0.77	0.88
7.6	0.89	0.75	0.86	0.68	0.78	0.83	0.77	0.80	0.86	0.86	0.87	0.79	0.79	0.87	0.76	0.82	0.83	0.79	0.76	0.79	0.83	0.82	0.85	0.83	0.84		0.74	0.83	0.74	0.72	0.89	0.83	0.87	0.84	0.75	0.76	0.89	0.76	0.78	0.74	0.81	0.78	0.84
7.7	0.78	0.72	0.75	0.65	0.76	0.70	0.74	0.73	0.75	0.70	0.74	0.82	0.72	0.76	0.79	0.70	0.77	0.82	0.68	0.71	0.73	0.70	0.79	0.77	0.78	0.74		0.70	0.67	0.69	0.79	0.70	0.81	0.72	0.61	0.63	0.78	0.84	0.70	0.59	0.68	0.70	0.73
7.8	0.82	0.82	0.88	0.70	0.80	0.75	0.79	0.86	0.84	0.93	0.74	0.81	0.86	0.84	0.73	0.88	0.85	0.81	0.88	0.92	0.85	0.84	0.87	0.85	0.82	0.83	0.70		0.86	0.84	0.83	0.85	0.80	0.76	0.82	0.78	0.91	0.78	0.85	0.65	0.88	0.90	0.77
7.9	0.87	0.88	0.84	0.81	0.85	0.71	0.80	0.91	0.89	0.89	0.65	0.82	0.86	0.89	0.74	0.93	0.86	0.82	0.93	0.87	0.90	0.84	0.88	0.86	0.83	0.74	0.67	0.86		0.90	0.83	0.90	0.85	0.86	0.93	0.79	0.83	0.74	0.90	0.72	0.88	0.90	0.78
7.10	0.86	0.97	0.83	0.79	0.79	0.74	0.89	0.81	0.83	0.83	0.67	0.80	0.85	0.84	0.62	0.88	0.80	0.75	0.87	0.91	0.80	0.73	0.77	0.80	0.76	0.72	0.69	0.84	0.90		0.77	0.89	0.84	0.90	0.86	0.67	0.81	0.72	0.79	0.69	0.82	0.95	0.71
7.12	0.92	0.80	0.86	0.78	0.90	0.87	0.82	0.88	0.94	0.86	0.82	0.92	0.83	0.90	0.85	0.86	0.94	0.88	0.85	0.79	0.94	0.90	0.96	0.94	0.92	0.89	0.79	0.83	0.83	0.77		0.83	0.94	0.88	0.80	0.81	0.92	0.85	0.83	0.74	0.85	0.83	0.96
8.1	0.91	0.92	0.88	0.75	0.80	0.65	0.79	0.91	0.84	0.93	0.74	0.81	0.86	0.89	0.68	0.93	0.81	0.81	0.83	0.92	0.85	0.79	0.83	0.81	0.77	0.83	0.70	0.85	0.90	0.89	0.83		0.89	0.90	0.92	0.78	0.82	0.73	0.80	0.70	0.88	0.90	0.77
8.2	0.98	0.86	0.92	0.84	0.92	0.80	0.84	0.90	0.92	0.88	0.79	0.89	0.85	0.96	0.78	0.88	0.92	0.89	0.83	0.81	0.92	0.83	0.90	0.92	0.86	0.87	0.81	0.80	0.85	0.84	0.94	0.89		0.94	0.82	0.78	0.90	0.83	0.80	0.76	0.83	0.84	0.90
8.3	0.96	0.93	0.89	0.86	0.85	0.76	0.85	0.83	0.89	0.84	0.75	0.82	0.86	0.94	0.70	0.89	0.86	0.82	0.84	0.82	0.86	0.80	0.83	0.86	0.83	0.84	0.72	0.76	0.86	0.90	0.88	0.90	0.94		0.83	0.74	0.87	0.79	0.76	0.82	0.84	0.86	0.83
8.4	0.84	0.84	0.81	0.77	0.77	0.67	0.76	0.88	0.86	0.86	0.65	0.83	0.78	0.82	0.65	0.86	0.78	0.73	0.85	0.89	0.83	0.76	0.80	0.78	0.74	0.75	0.61	0.82	0.93	0.86	0.80	0.92	0.82	0.83		0.75	0.74	0.65	0.82	0.61	0.80	0.87	0.79
9.2	0.80	0.70	0.82	0.68	0.78	0.68	0.56	0.84	0.77	0.86	0.67	0.70	0.74	0.83	0.67	0.82	0.83	0.74	0.76	0.68	0.88	0.86	0.81	0.83	0.76	0.76	0.63	0.78	0.79	0.67	0.81	0.78	0.78	0.74	0.75		0.80	0.76	0.78	0.63	0.76	0.73	0.76
9.5	0.92	0.84	0.94	0.77	0.90	0.82	0.81	0.83	0.89	0.89	0.76	0.87	0.91	0.94	0.80	0.89	0.94	0.87	0.89	0.83	0.90	0.89	0.92	0.94	0.88	0.89	0.78	0.91	0.83	0.81	0.92	0.82	0.90	0.87	0.74	0.80		0.89	0.82	0.78	0.89	0.86	0.88
9.9	0.80	0.75	0.82	0.78	0.83	0.73	0.77	0.76	0.77	0.77	0.72	0.79	0.84	0.83	0.76	0.82	0.88	0.84	0.81	0.74	0.83	0.82	0.85	0.88	0.80	0.76	0.84	0.78	0.74	0.72	0.85	0.73	0.83	0.79	0.65	0.76	0.89		0.73	0.74	0.81	0.78	0.80
9.10	0.82	0.77	0.79	0.70	0.80	0.75	0.79	0.86	0.88	0.84	0.68	0.81	0.76	0.84	0.73	0.84	0.81	0.81	0.88	0.81	0.85	0.88	0.87	0.81	0.82	0.78	0.70	0.85	0.90	0.79	0.83	0.80	0.80	0.76	0.82	0.78	0.82	0.73		0.70	0.83	0.80	0.77
9.11	0.78	0.72	0.75	0.81	0.76	0.65	0.74	0.68	0.75	0.70	0.69	0.67	0.77	0.81	0.63	0.75	0.73	0.82	0.74	0.65	0.73	0.75	0.74	0.73	0.73	0.74	0.59	0.65	0.72	0.69	0.74	0.70	0.76	0.82	0.61	0.63	0.78	0.74	0.70		0.79	0.65	0.73
9.16	0.84	0.85	0.82	0.78	0.83	0.68	0.77	0.84	0.82	0.91	0.72	0.79	0.88	0.87	0.81	0.95	0.83	0.88	0.86	0.84	0.88	0.91	0.89	0.83	0.84	0.81	0.68	0.88	0.88	0.82	0.85	0.88	0.83	0.84	0.80	0.76	0.89	0.81	0.83	0.79		0.88	0.84
9.17	0.86	0.92	0.84	0.75	0.80	0.75	0.84	0.82	0.84	0.88	0.68	0.81	0.90	0.84	0.68	0.93	0.85	0.76	0.88	0.92	0.85	0.79	0.83	0.85	0.77	0.78	0.70	0.90	0.90	0.95	0.83	0.90	0.84	0.86	0.87	0.73	0.86	0.78	0.80	0.65	0.88		0.77
9.18	0.88	0.74	0.81	0.82	0.90	0.82	0.76	0.83	0.89	0.81	0.76	0.91	0.78	0.86	0.84	0.81	0.90	0.87	0.80	0.73	0.90	0.89	0.92	0.90	0.88	0.84	0.73	0.77	0.78	0.71	0.96	0.77	0.90	0.83	0.79	0.76	0.88	0.80	0.77	0.73	0.84	0.77	
Av. R	0.84	0.80	0.83	0.75	0.83	0.74	0.77	0.83	0.83	0.83	0.72	0.81	0.81	0.85	0.74	0.83	0.84	0.81	0.81	0.78	0.84	0.81	0.85	0.84	0.81	0.79	0.71	0.80	0.82	0.78	0.84	0.81	0.84	0.82	0.77	0.74	0.84	0.77	0.78	0.70	0.81	0.81	0.81

Table 3 Correlation matrix for the selected success factors; cells filled black do not require further investigation, as the correlation falls below the threshold of R = 0.75



ANNEX 4 IMPACT MATRIX FOR ALL SUCCESS FACTOR COMBINATIONS

Table 4 Impact matrix for all success factor combinations (0 = no effect; 1 weak effect; 2 medium effect; 3 strong effect); reading order: factor x impacts o factor y with effect level {0,1,2,3}

x \ y	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.1	3.3	4.2	4.3	4.4	5.1	5.5	5.6	6.1	6.2	6.3	6.4	6.6	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	7.10	7.12	8.1	8.2	8.3	8.4	9.2	9.5	9.9	9.10	9.11	9.16	9.17	9.18	A.	B.	C.	D.	E.	F.
2.1	0	1	0	1	0	0	0	1	1	1	1	1	0	0	0	2	1	1	0	0	0	0	1	1	2	2	1	1	2	2	2	2	1	1	1	0	2	1	1	0	0	0	0	0	0	0	0	1	0
2.2	2	0	0	2	1	0	1	1	1	1	0	1	0	0	0	1	2	2	1	1	1	1	1	1	1	1	0	0	2	2	2	1	1	1	1	0	2	2	2	0	1	1	0	0	0	0	0	1	1
2.3	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	1	0	2	0	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	0	2	1	1	1	1	0	0	1	1	1	1	0	1
2.5	1	1	2	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	1	0	1	1	2	0	0	0	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1
2.6	0	0	1	0	0	0	1	1	1	1	0	1	0	0	0	0	1	0	1	1	0	0	1	1	0	2	1	0	1	1	2	1	0	0	0	0	2	1	1	0	1	1	1	0	1	0	1	0	1
2.7	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	2	2	2	1	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0
2.8	1	0	0	0	0	0	0	1	0	0	0	2	0	1	0	0	1	0	2	2	0	0	2	2	2	1	0	1	1	1	1	0	0	0	0	0	2	2	1	0	1	1	1	1	0	0	0	1	1
3.1	2	1	0	0	2	0	1	0	0	2	2	2	0	0	0	0	1	0	0	1	1	2	1	1	0	0	0	2	1	1	0	2	0	1	1	0	0	1	1	0	0	1	1	0	1	1	1	1	1
3.3	1	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	1	1	0	0	0	1	1	1	1	2	2	1	0	1	0	1	0	0	0	0	1	0	0	0	1	1
4.2	1	0	0	0	1	0	0	2	0	0	2	2	0	0	0	0	2	0	0	0	1	1	1	1	0	1	0	1	1	1	0	1	1	1	2	0	0	0	0	0	0	0	1	0	1	1	0	1	2
4.3	1	0	0	0	0	0	0	2	0	1	0	1	0	0	0	0	0	1	0	0	2	0	1	1	0	2	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	2
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5.6	0	0	0	0	2	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	2	2	2	2	0	2	3	0	0	0	2	0	1	0	0	0	2	2	0	0	1	0	0	1	1	0	0	1	2
6.1	2	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	2	1	1	0	0	1	1	1	3	1	0	0	1	1	1	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1
6.2	1	0	1	0	1	0	1	1	0	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1	2	2	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	1	1
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7.1	0	0	0	0	2	1	1	1	0	1	2	1	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0	1	2	1	1	0	1	0	0	2	2	2	0	1	1
7.2	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0	1	1	2	1	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	2	1	0	0	1	2
7.3	1	0	2	0	2	2	2	1	2	1	2	1	0	0	1	2	1	2	2	0	2	2	0	1	2	2	2	2	0	0	0	0	0	0	0	0	2	2	2	0	2	2	2	2	2	0	0	2	2
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7.7	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	2	0	0	0	0	1
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7.12	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	1	3	3	1	2	2	1	1	1	0	0	0	0	1	1	2	2	2	0	2	2	2	2	1	2	0	0	1
8.1	2	1	1	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	0	1	1	1	0	1
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9.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	2	2	1	1	0	0	1	0	1	0	1	0	0	0	0	1	1	0	1	0	2	2	2	2	0	1	2
9.5	1	0	1	1	0	1	1	0	0	1	1	0	0	0	1	0	0	2	1	0	1	1	2	2	1	2	1	0	2	1	3	1	1	0	0	1	0	1	1	0	2	2	2	1	2	0	0	2	1
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9.16	2	2	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0	2	0	1	2	2	2	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	2	0
9.17	2	1	1	0	1	0	0	1	0	1	0	0	0	1	0	0	1	1	1	1	0	0	2	2	1	2	0	0	0	0	1	0	1	1	0	0	2	2	0	0	1	0	1	1	1	1	0	2	0
9.18	2	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	2	0	2	1	1	1	1	0	0	0	1	0	0	0	0	1	1	0	0	1	0
A.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	1	0	1	1	1	0	1	1	0	1	0	0	1	0	0	0	0	1	0	1	0	2	1
B.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	2	3	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	2	0	3	2
C.	2	1	0	0	1	0	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	1	1	1	2	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	0	0	2	3
D.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3	2
E.	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	2
F.	3	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1	1	0	0	0	2	1	0	1	1	2	1	1	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0

ANNEX 5 OVERVIEW OF THE FACTORS THAT BELONG TO EACH OF THE FOUR PATTERNS

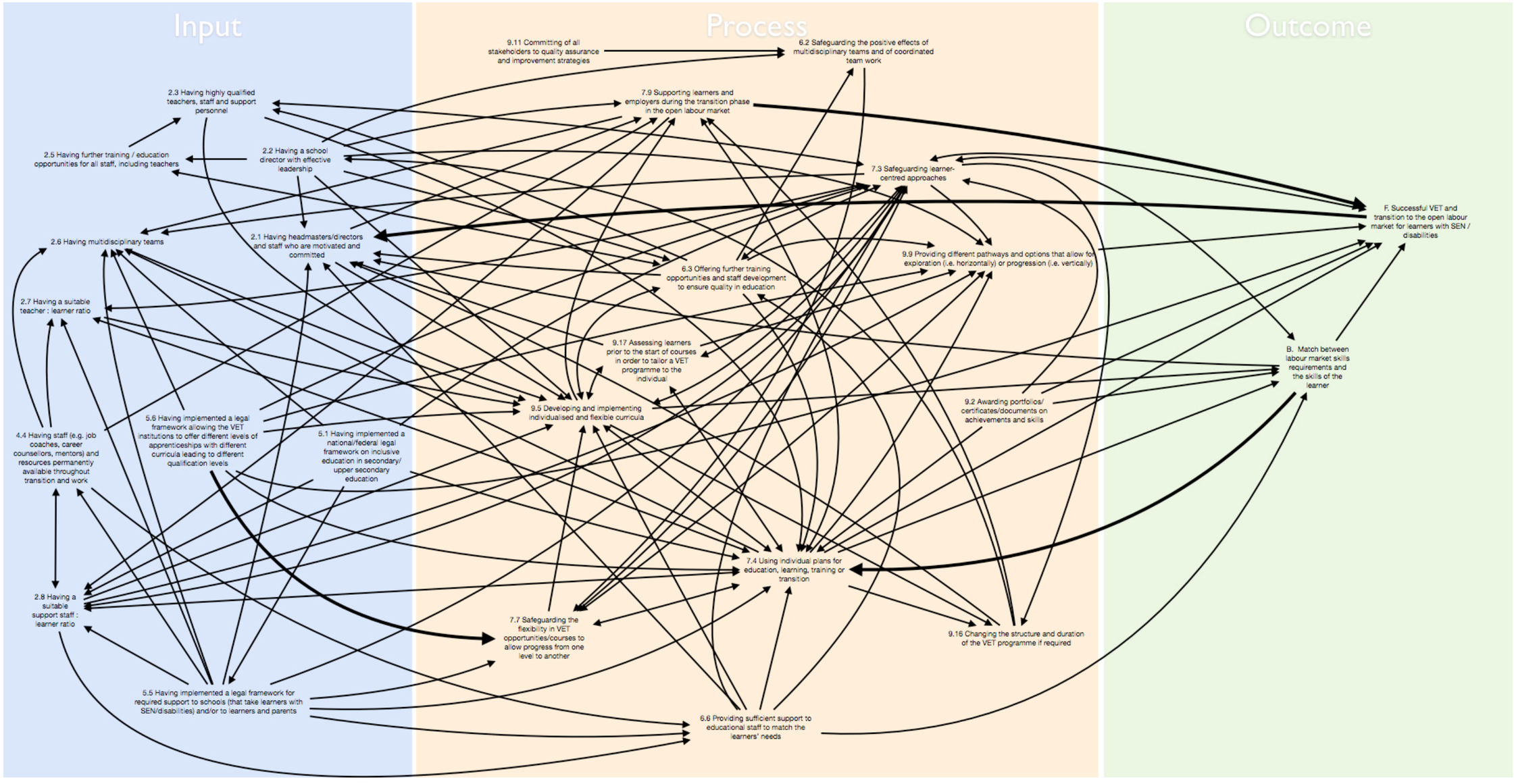

Diagram 1 VET system model: VET institution management pattern

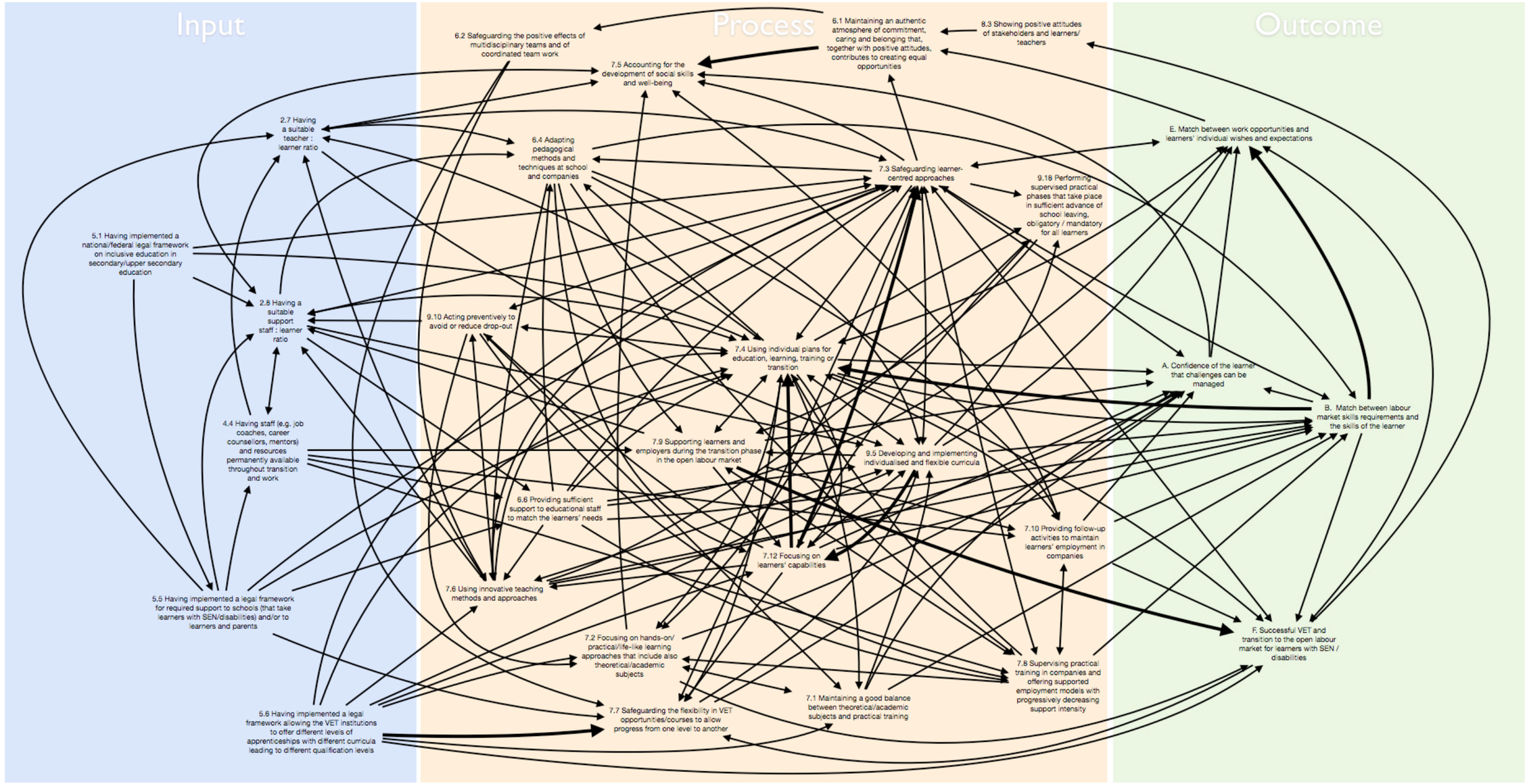

Diagram 2 VET system model: Vocational education and training pattern

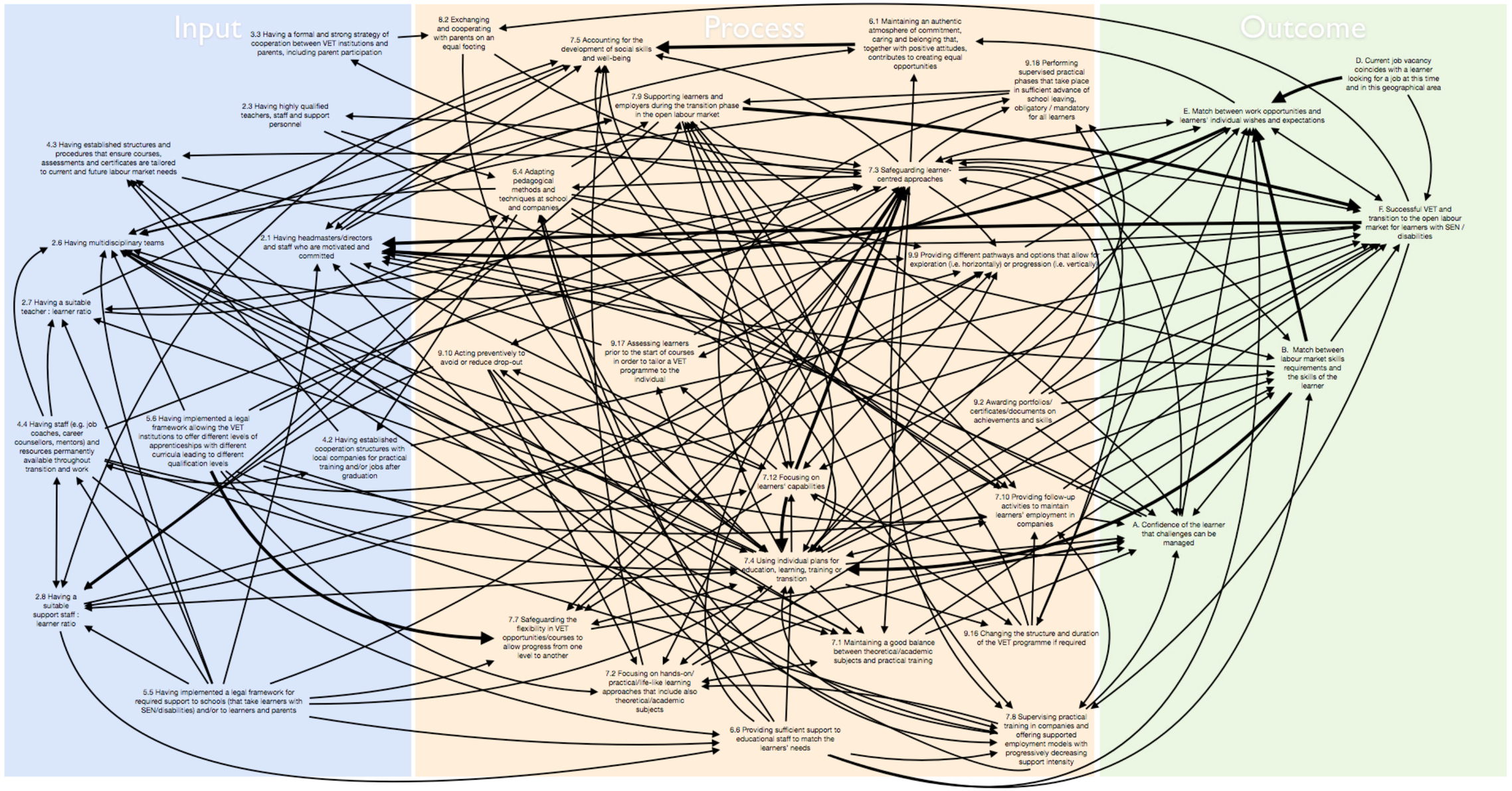

Diagram 3 VET system model: Learners' pattern

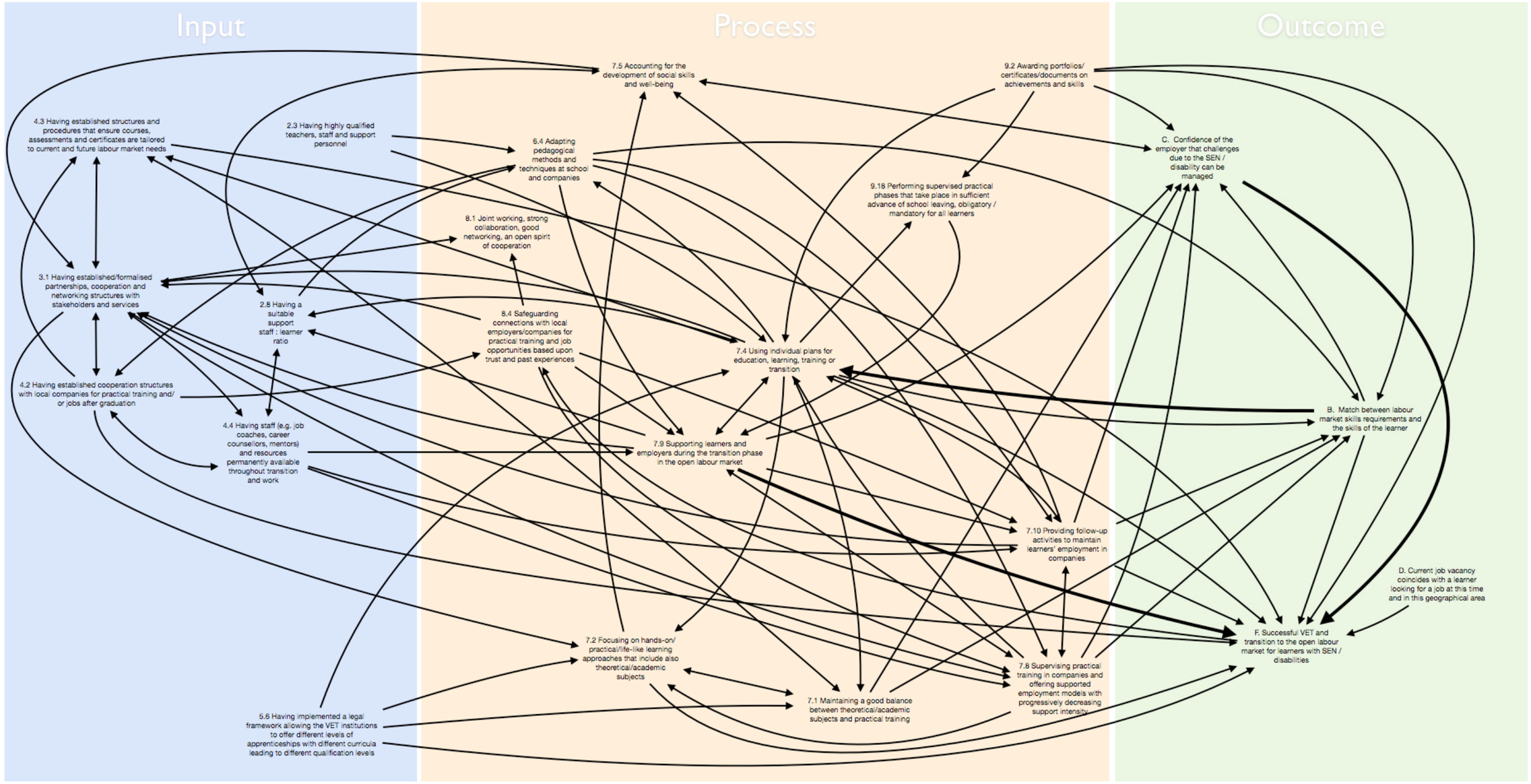

Diagram 4 VET system model: Labour market pattern

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