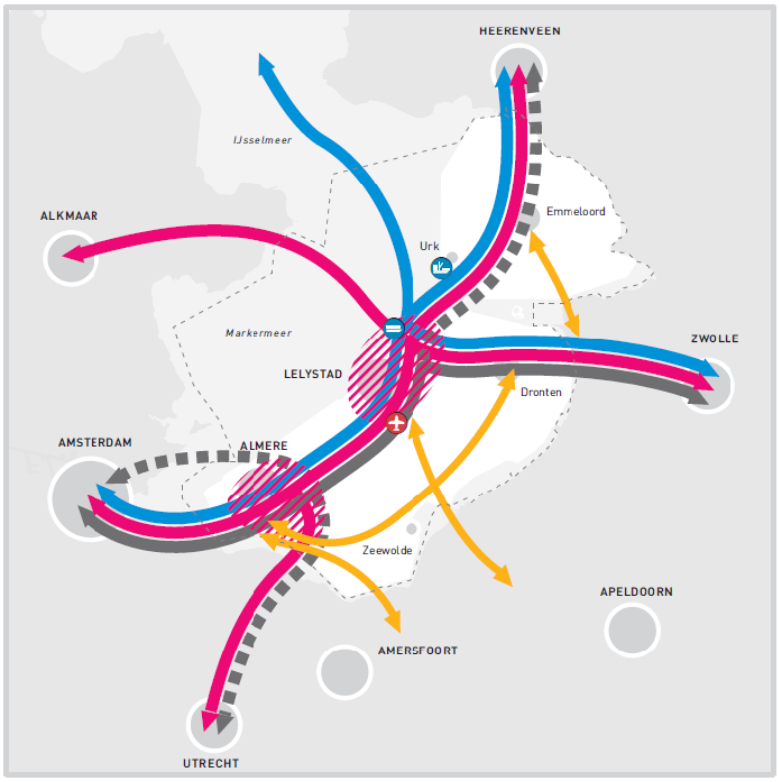
DOES EDUCATION MATTER?

Jacco Frehé



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Abstract

The fit between vocational and higher education and the pertinent work sector is often discussed. Logistics Cluster Flevoland (LCF) is an organisation that promotes cooperation between educational institutions and logistics firms in the cluster. This mission means that the cluster is a valuable subject for study of the connection between educational institutions and the day-to-day business of logistics firms. This research examines the relationship between the educational institutions ROC Flevoland and the University of Applied Sciences Windesheim (Windesheim) and the logistic firms. The results of the study create insights into their connection and contributions and show the visions and perceptions of the parties concerned. The research design uses a mixed-methods approach. The quantitative part of the research focuses on logistics students' perceptions of the influence of guest lectures, internships, student projects, curriculum and research and development on the link between the logistics curriculum and the educational institution's interaction with the day-to-day business in logistics firms. For this analysis, a survey was conducted amongst students of logistics-related studies at ROC Flevoland and Windesheim. Semi-structured interviews were conducted with the participating parties in the LCF cooperation, including municipalities, educational institutions and firms. The interviews provide insights into the role of the LCF organisation, the mutual contact between the educational institutions and the firms, and the flow of theoretical and student knowledge. The results show that the connection and contribution of the educational institutions Windesheim and ROC Flevoland are relatively low. ROC Flevoland mainly contributes with the provision of practically skilled students and graduates who can work or perform internships in the warehouses and related traditional roles, such as truck driver. Windesheim mainly contributes to the cluster by providing some theoretical knowledge from research and theoretically skilled students and graduates who can work or perform internships in, for example, logistics management, supply chain management and data management. The organisations involved can learn about each other's perceptions and visions from the study, which can strengthen the education-firm collaboration, the logistics curriculum and its link to working practice. Both the educational institutions and firms in the LCF state that the cooperation can be improved significantly. Better coordination and more intensive contact can ensure that both parties are more in tune with one another to create more concrete agreements together, since a mismatch is still present in their respective visions. Schools are adopting a more long-term vision, while companies maintain a short-term vision.

Keywords: cluster, logistics, education, firm, education-firm collaboration

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List of Abbreviations

Abbreviation	**Definition**
LCF	Logistics Cluster Flevoland
Windesheim	University of Applied Sciences Windesheim
MBO	Intermediate Vocational Level
HBO	Higher Vocational Level
RIF	Regional Investment Fund
SME	Small and Medium Enterprises

I. Introduction

I.I Background

The province of Flevoland has developed into a thriving economy and become a new home and work area for many people from the Randstad area. An interesting development over the last two and half years has been the creation of Logistics Cluster Flevoland (LCF), which was founded in 2020 (Ons Lelystad, 2020). The cluster is in the centre of the Netherlands, in an open area covering the region between the cities of Lelystad, Almere and Zeewolde in the province of Flevoland. The region comprises a relatively high number of logistics-related firms.

The main partners and initiators of LCF are the municipalities of Almere, Lelystad and Zeewolde, the educational institutions of the University of Applied Sciences Windesheim (Windesheim) and ROC Flevoland, Horizon Flevoland and Win4All-Economic Board Flevoland (Logistiek Cluster Flevoland, 2020). The partners emphasise the connection of education to the current demand by firms. The partners have a collaborative approach to the training of future employees and the mobilisation of labour for the logistics sector (Logistiek Cluster Flevoland, 2020).

The initiators can be divided into three groups: (non-profit) firms, educational institutions and governmental bodies. This trio of cooperation is often called the ‘Triple Helix’ (Logistiek, 2021). This research focuses on the collaboration between the educational institutions and the firms, and specifically on the connection and contribution of educational institutions to the day-to-day business in the logistic firms.

Whether education connects well with business is debated in many sectors, and it is often concluded there is a limited link between education and business in practice (Fouarge et al., 2018; Bisschop et al., 2021; Boon, 2020). It is useful to analyse the connection and contribution of educational institutions in Flevoland to firms in the logistics cluster.

Both ROC Flevoland and Windesheim are connected to the logistics cluster and are important partners. ROC Flevoland is in Lelystad and Almere, and Windesheim is in Almere and Zwolle (LCF, 2020). The educational institutions have close connections with the LCF and focus on educating students who are demanded by the local labour market. It is fruitful to analyse whether the logistics curriculum of Windesheim and ROC Flevoland meaningful connect with the day-to-day business of firms in the logistics cluster.

I.II Societal relevance

This bachelor's thesis has societal significance, because it examines how far the logistics curriculum at Windesheim and ROC Flevoland contribute to the firms in the LCF. The result of the research has a direct impact on society, since it shows whether schools 'produce' a significant amount of valuable theoretical or practical knowledge for students enabling them to have a meaningful connection, through their logistics curriculum, to the logistics cluster. It continues to be common that students experience the transition of studying towards getting a job in a firm as a major step (Salomon, 2015). It has often been observed there is a limited link between a curriculum and business in practice (Bisschop et al., 2021). The LCF states that the cluster focuses actively on the partnership with the educational institutions, and the educational institutions state they want to contribute to the development of specialist knowledge for the LCF (LCF, 2020). Windesheim has an active knowledge centre where logistics research is performed. The director of the knowledge centre states that collaboration is a next step in the regional affiliation of Windesheim (RTV, 2022). Further examining the strength and meaningfulness of the collaboration can provide fruitful information on the regional affiliation of the educational institution and upcoming employees.

This research, therefore, analyses the connection of logistics curricula at the educational institutions to the day-to-day business of firms in the logistics cluster in Flevoland. This exploration is focused on the content of the current logistics curriculum at Windesheim and ROC Flevoland. The results of the research can develop or further improve the educational sector and its partnership with the firms in logistics clusters. The acquired knowledge can provide meaningful insights into the connection of education to the logistics field of work in Flevoland, specifically focusing on the actual connection to a firm's day-to-day business in the logistics cluster region. Based on these outcomes, educational institutions, firms and municipalities can continue their actions or place more focus on given aspects uncovered in the research. Insight into the cooperation and connection of educational institutions with the logistics cluster could also uncover important aspects influential in how students experience connecting to the work field after they complete their logistics study programme.

The results of the research are expected to interest both the educational institutions and the firms in the cluster. The results can enable these concerned parties to gain better insight into their current connection and potentially improve future connection and collaboration. Educational institutions can directly benefit by considering the results regarding the content of their curriculum and the linking of these contents to business in practice. More meaningful and relevant curriculum for students in those specific logistics

curricula can be provided. Students are then likely to be better connected and to more easily enrol for work in the logistics business sector. The participating firms can benefit from the results, because they are likely to receive students with a better underpinning and connection to their day-to-day business. So, the results of the research will have societal benefits for both firms in the logistics sector, educational institutions Windesheim and ROC, and students (or upcoming employees). The results show the meaningfulness of the educational connection to the firms. Building further upon the results, the educational institutions, at both higher and vocational levels, and the firms can increase the number of skilled logistics students, the logistics expertise and logistics capital. These outcomes can contribute to a higher quality of life. As Martinez and Narula (2018) have stated, a collaboration between firms and education can be beneficial for the participating firms because a significant contribution from the educational institutions is beneficial. This contribution allows an equitable division of costs and increased competences in the collaboration.

I.III Scientific relevance

This bachelor's thesis is scientifically relevant because it increases our understanding of the direct connection between logistics curricula at educational institutions and firms within the logistics sector. Many studies have been carried out on the effect of universities and higher education on the innovation and development of firms, which are discussed below. There are only a few studies on the collaboration between vocational education and (logistics) firms. Several relevant studies are discussed below.

Many studies have focused on the analysis of theoretical knowledge transfer from universities or higher education to firms (Pinto & Guerreiro, 2019; Alexander & Miller, 2017; Nielsen & Cappelen, 2014), but few studies have focused on the relation between the logistics sector and educational institutions. Changhee and Won (2019) have focused on the contribution of higher education to innovation in logistics firms. The results show that the logistics firms do not consider higher education institutes as crucial sources of information for achieving logistics innovation (Changhee & Won, 2019). The results also show that logistics firms experience low innovation when information sources for innovation are excluded or not considered (Changhee & Won, 2019). To further examine the connection and contribution of education to logistic firms, the exact connection of logistic curricula to the logistic work field can be explored more extensively. Velinova et al. (2020) have found that most firms have limited interactions or do not interact with higher educational institution(s). The present relationship in logistics is related to education activities, such as internships, and less related to research, projects and innovation (Vellinova et al., 2020). The majority of existing studies solely focus on higher education

and do not take intermediate vocational education into account, whereas this research incorporates an intermediate educational institution, ROC Flevoland.

Paytas et al. (2004) have conducted a study on universities and the development of industrial clusters. They describe how, within a region, universities can affect the growth of emerging clusters, but the commitment of university resources and the variety of aligned departments is crucial (Paytas et al., 2004). There are many examples of how new industries have formed due to university research, however, the path from university research to cluster development is not simple or direct (Paytas et al., 2004). This research differentiates itself from the study by Paytas et al. by considering higher vocational level education at Windesheim and vocational level education at ROC Flevoland. The research focuses on a logistics cluster that consists of different firms and jobs compared to an industrial cluster.

Krstic and Damnjanovic (2016) have emphasised the importance of the partnership of universities in clusters, since universities can play an important role in providing future employees, developing new technologies and in innovating. Partnership should come from both sides, meaning the universities should adapt their curricula to market needs. Firms should provide sufficient practical training to students in all sectors of the economy (Krstic & Damnjanovic, 2016). A cluster partnership between universities and cluster firms should recognise and enforce the potential of students and select promising human resources as future employees (Krstic & Damjanovic, 2016). Krstic and Damnjanovic (2016) have described how the government of Serbia began several activities implementing various measures aimed at linking science and economy. These actions did not provide significant results for the improvement of business clusters. Transferring this outcome to the context of LCF could mean that the partnership between educational institutions and the cluster is more important, compared to partnership with the government and the cluster within the so called ‘Triple Helix’. The research is exploring the education-firm partnership.

High-tech clusters are known for the rise of spin-off organisations. This research fills another knowledge gap by examining to what extent these spin-offs occur for a logistics cluster (Motashi, 2004). Trends used to focus only on large organisations, but research by Motashi (2004) has shown that small- and medium-sized firms are also increasingly willing to interact with educational institutions. The LCF comprises many large logistics firms mentioned in the introduction and also includes many small- and medium-sized logistics firms. This research can, therefore, provide insights to analyse this changing trend for the LCF.

Basant and Chandra (2007) have stated that their survey suggests that, unlike academic institutions, only research institutions have the capabilities to exploit the opportunity of interaction with firms fully. There is a clear hierarchy regarding the contribution levels of institutions: those that undertake only teaching (connection through labour market), those that do research and teaching (linkages through knowledge generation), and those that focus on specialised research (connection through knowledge generation and dissemination) (Basant & Chandra, 2007). A distinction can also be made between educational institutions based on whether they conduct research. In contrast to this finding, the LCF mentions that the partners of interest are important to the logistics cluster (LCF, 2020). It is, therefore, useful to explore the connection and contribution to the firms in the logistics cluster by educational institutions that mostly undertake teaching, which is ROC Flevoland, and that perform both research and teaching, which is Windesheim.

In contrast to the existing literature, this research focuses on the connection between intermediate vocational and higher vocational educational institutions with a logistics cluster. Most previous research conducted has focused on industrial clusters or knowledge clusters, whereas the cluster of interest here is a logistics cluster. Thereby, this research focuses on higher vocational levels and on intermediate vocational education. It is not solely focused on the more highly educated students who are relatively more theoretically oriented. It also includes a more practically oriented educational institution. A relatively high number of existing studies solely focus on research and development (R&D) collaboration. This research also incorporates other ways in which firms interact with universities, such as guest lectures, internships and students projects. Overall, this research can increase our understanding of the connection and contribution of educational institutions of different vocational levels to the LCF.

I.IV Research question

The goal of the research is to gain an understanding of the connection and contribution of the educational institutions to the firms in the LCF. The research question is formulated as follows: *How do the logistics curricula at the University of Applied Sciences Windesheim and ROC Flevoland connect to the day-to-day business of firms in the LCF?*

In answering the research question, an analysis is made of the connection between the curriculum of Windesheim and ROC Flevoland with the firms in the logistics cluster. This can provide clarity on the importance and contribution of Windesheim and ROC Flevoland to the firms in the LCF.

The main research question is answered by formulating answers to the following sub-questions:

1. *How do students perceive the connection of the curriculum to the day-to-day business in logistics firms?*
2. *How does the mutual contact between the firms and the educational institutions influence the connection of the logistics curricula with the day-to-day business in logistics firms?*
3. *How does theoretical knowledge within the educational institutions influence the connection of the logistics curricula to the firm's day-to-day business?*
4. *How does the student knowledge within the educational institutions influence the connection of the logistics curricula to the firm's day-to-day business?*
5. *How does the adopted approach of the LCF organisation influence the educational institutions' connection with the firm's day-to-day business?*

The introductory chapter provides background information regarding the reason for the study, the research question, and the societal and scientific relevance. The second chapter highlights relevant literature, in order to situate the forthcoming research within the existing theoretical knowledge and knowledge gaps. The third chapter provides further explanation and justification for the research methodology used, focusing on the data collection methods and data analysis. The fourth chapter presents the descriptive statistics and exploration of the research data, this is followed by a discussion in the fifth chapter. Lastly, the sixth chapter provides a brief conclusion of the research findings, followed by the limitation of the research and the recommendation for praxis and future research.

II. Literature review

In the previous section (I.III), discussing the scientific relevance of the proposed study, a number of research studies were discussed that have focused on the role of universities in the formation of clusters. In the case of this research, a cluster has already been formed and the focus is on the contribution of the educational institutions to the firms in the cluster. This section discusses existing literature that has analysed this type of connection or partnership. Based on the existing literature, four recurring themes are set out in this chapter.

II.I The link between the logistics curriculum and logistic work field

Paytas et al. (2004) have stressed the importance of diverse and complementary units within educational institutions that broadly address the needs of the cluster. Educational institutions should strongly focus on research and technology to be of importance to the cluster. Paytas et al. (2004) have suggested that how research and technology is transferred between the educational institutions and firms is less important. The educational institution's focus should cover thorough involvement, a sturdy base of research and development (R&D) and regional alignment (Paytas et al., 2004).

Lee et al. (2019) examined the creation of a curriculum that focuses on learning goals and objectives to educate experienced professionals that can immediately perform practical tasks as soon as they finish the curriculum. This type of curriculum helps revealing problems in the existing curriculum from a practical point of view (Lee et al., 2019).

Krstic and Damnjanovic (2016) have performed a close analysis on the significance and role of educational institutions for a textile-cluster in Serbia. Their analysis uncovered several important internal and external factors concerning cooperation between the educational institutions and the firms within the cluster. Important internal factors are the harmonisation of the curricula to the needs of the market, reducing unemployment, providing practical training to students, initiating economic activities and innovations that can result from cooperation (Krstic & Damnjanovic, 2016). External factors of interest are cooperative relations between clusters and cross-collaboration with educational institutions and other clusters (Krstic & Damnjanovic, 2016).

Previous researchers have also stated that the level hierarchy of educational institutions could be of importance for the level of contribution to the cluster (Motashi, 2004). This research focuses on two educational institutions that perform at different levels of teaching orientation. It would, therefore, be expected that differences in contribution could be present. The University of Applied Sciences Windesheim offers

curriculum and research on the higher vocational level (Hogeschool Windesheim, 2022). ROC Flevoland offers curriculum on the intermediate vocational level (ROC van Flevoland, 2022).

Burdakova and Byankin (2019) have stated that educational institutions have key functions within an innovative cluster. The core of this key function is based on educational programming, training, retraining and research in close collaboration with the firms within the cluster.

Several studies have addressed the link between curriculum at educational institutions and firms or practice. Eldon et al. (2008) have argued that educational institutions should make enhancements in their curricula to respond to industry needs. This would ensure that the educational institutions could benefit from creating courses that are more relevant to industry and student needs (Eldon et al., 2008). Eldon et al. (2008) have also claimed that a poor fit between industry demand and curricular emphasis can hinder business in the region. Fitting curricula to industry needs can improve the link between the curriculum at the educational institutions and industry demand and, therefore, improve the connection and contribution of the educational institutions to the firms in the cluster. Bir and Yadav (2021) and Wu et al. (2013) have highlighted the need for educators to pay attention to the widening gap between their course content and the skills required in the industry. Blurring the gap between industry requirements and course content can benefit both the educational institutions and the employers. Educational institutions should educate their students, following curricula that fit the needs of the labour market (Navarro et al., 2009). Employers would gain a more suitable workforce, and the educational institutions could improve the employability of their graduates in the job market. The link between curriculum and day-to-day business in firms would be enhanced (Bir & Yadav, 2021). Properly structured curricula can improve the link between curriculum at educational institutions and firms' needs, and improve the institutions' connection and contribution to the firms in the relevant sector.

Riebe et al. (2013), Metrejean et al. (2010) and Ormrod (2006) have found that guest speakers play an important role in active learning by exposing students to the 'real world' of the workplace. This can significantly affect students' employability skills, future career success, connect them to the industry and increase their knowledge. Ormrod (2006) has highlighted that guest lectures foster and promote active learning in all aspects of the course at an educational institution. Research results have also shown that guest lectures add value to the curriculum and students find better connection to practice (Merle & Craig, 2016). According to Merle and Craig (2016), professors focus on theoretical

underpinnings, while practitioners provide students with a clearer understanding of professional implications. This approach strengthens the connection between educational institutions and the industry. It can therefore be concluded that guest lectures play a vital role in the knowledge of students at educational institutions with regards to their connection and contribution to the industry.

II.II Mutual contact between educational institutions and firms

Paytas et al. (2004) have also argued that cooperation of interest is not a one-way partnership. The firms should focus on being receptive and can absorb people and technology produced by the educational institutions. According to Paytas et al. (2004), clusters that are relatively more externally organised and oriented may facilitate university-derived benefits outside the region of the cluster. The firms should offer a fertile climate for the input of the educational institutions to flourish in the region. This can be achieved through an effective pattern of organisation, market trends and the lifecycle of the industry or technology of the firms in the cluster (Paytas et al., 2004).

According to the research results of Burdakova and Byankin (2019), close contact between the educational institutions and firms within the cluster is important for the connection and contribution of Windesheim and ROC Flevoland to the day-to-day business in the LCF. The development of an innovative infrastructure between the parties of interest encourages fresh forms of cooperation between the educational institutions and the cluster participants (Burdakova & Byankin, 2019). The foundation of the LCF can be seen as an innovative infrastructure, therefore it can be said that novel forms of cooperation are expected to develop since the establishment of LCF.

Moon et al. (2019) have proven that activities undertaken by higher educational institutions, both people-based and problem-solving activities, affect the innovation performance of firms. They have shown that educational institutions help identify specific activities that improve product and process innovation. Besides the input of the educational institutions, Moon et al. (2019) have also the firms' capacities to assimilate new information. They have stated that the firm's capacity to take in information has a moderating role in the cooperation. According to Moon et al. (2019) an effective level of assimilation capacity can create maximum firm innovation. It is stressed that this capacity should be at an effective level rather than at its maximum. If a firm absorbs too much innovative information, it might overload the firm or employees, causing the higher education's contribution to affect the innovation negatively (Moon et al., 2019). Translating this to the context of LCF could suggest that both the approach of the educational institutions and the approach of the firms apply to transferring knowledge within the

cooperation. Firms should resolve their problems through consulting services or joint projects with the educational institutions, rather than focusing on participation in conferences (Moon et al., 2019). These findings emphasise the importance of working together, rather than simply organising meetings together. Moon et al. (2019) have made a clear distinction between people-based activities and problem-solving activities. This is expected to possibly be applicable to the logistic work field. The LCF provides jobs for people working in warehouses, people-based activities, as well as jobs for people working on process development and management, problem-solving activities.

The results of a study performed by Meyer (2006) showed that almost half of small to medium enterprises (SMEs) have had no working contact with a university or college. Those SMEs that collaborated with educational institutions were most commonly linked through participation in cooperative programmes, like internships, and general networking on graduate recruitment. Firms that were part of the cluster organisation did not approach an educational institution relationship with any appreciable distinctiveness (Meyer, 2006). The study has concluded that when firms have pursued mutual contact through a working relationship with an educational institution, it has mainly been to secure in-house 'people' resources, rather than to develop highly structured faculty contacts (Meyer, 2006). The governments or a facilitating organisation should encourage contact between firms and educational institutions to develop curricula that generate skilled students within the sector, which match the needs within the sector (Meyer, 2006).

Owosu et al. (2021) have also found that regarding mutual contact firm characteristics and attitude play an important role. The firm's strategy towards cooperation shows to be more important than the attitude of the educational institution. Findings show that an increasing amount of studies may even widen the gap between the production of knowledge by the educational institutions and the needs of local firms (Owosu et al., 2021). According to Owosu et al. (2021) firm related factors are shown to be stronger predictors of collaboration with educational institutions. Next to that, Owosu et al. (2021) and Fitjar and Rodrigues-Poze (2017) have found that firms tend to collaborate with educational institutions to connect with local networks, instead of due to what the local educational institutions have to offer.

Nielsen and Cappelen (2014) have stated that the involved parties should view each other as equal partners. This would lead to real value adding through knowledge transfer between educational institutions and firms. This requirement can be met by creating a better understanding of the roles and competences of the other party (Nielsen

& Cappelen, 2014). According to Nielsen and Cappelen (2014), continuous knowledge sharing throughout a collaboration is more highly valued compared to a final report.

Perkmann et al. (2011) have argued that analysis by looking forward is a relevant indicator of successful alliances between education and firms because significant retrospective results are often only visible in the medium or long term. Therefore, relatively short-period research should emphasise relevant prospective indicator(s). Training and learning opportunities are affected by training and education, however, industry involvement is an important element (Perkmann et al., 2011). This points out the importance of the involvement or attitude of the firms in the industry in mutual contact with the educational institution. According to Perkmann et al. (2011), norms and positive attitudes facilitate engagement. Intensity of involvement is vital to ensure that project work applies to the industry. Collaboration intensity in mutual contact is an important measure of the impact of an alliance, whereas frequent interaction between partners facilitates the transfer of know-how and tacit knowledge as opposed to formal exchange of codified research results (Perkmann et al. 2011). Vesperi et al. (2021) have stated that the intensity of the collaboration is relevant to the introduction of new knowledge and the transfer of academic knowledge and people. The organisational culture should be ready for change and interaction because this can encourage the transfer of knowledge and human capital, which ensures that the firm can survive and compete in the market (Vesperi et al., 2021). This emphasises the importance of a proactive attitude in mutual contact towards connections and transfer with each other, besides the importance of high intensity of contact between both parties in a collaboration. The attitudes of the participants within a collaboration are important for its success. Kaklauskas et al. (2018) have emphasised that involvement of the educational institution is fundamental in an interactive and cooperative partnership.

According to Franco et al. (2019), both parties within a collaboration should feel a given amount of pressure. Educational institutions feel pressure to adapt to the firms' requirements and, simultaneously, firms feel pressure because of their need for a highly qualified workforce that only the educational institutions can train (Franco et al., 2019). Theoretical knowledge transfer within an educational institutions–firm partnership can lead to innovation transfer between organisations, which improves developments and new opportunities for both the educational institutions and the firms (Franco et al., 2019). The attitude of the involved parties is a crucial element of interaction. Franco et al. (2019) have argued that organisation and management questions are critical factors that facilitate or inhibit mutual contact between educational institutions and firms. The parties should, therefore, adopt an attitude in their organisation and management that strengthens the

relationship. The attitude of the parties in mutual contact is important to the quality of the partnership. All parties involved in a partnership should strive to increase the benefits and improve their most vulnerable aspects (Franco et al., 2019).

Chatterton and Goddard (2000) have emphasised that, within a participation programme, there is likely to be a requirement for active institutional participation. Results have also shown that attitudes towards 'knowledge sharing' affect the innovation of firms (Liu & Zeinaly, 2020). Firms should adopt a proactive attitude regarding knowledge sharing, to achieve a maximum transfer of knowledge within and between knowledge partnerships. Focusing on the knowledge within society and within institutions, a positive attitude towards knowledge sharing is required (Chedid et al., 2020). Regarding the study performed by Chatterton and Goddard (2000), ROC Flevoland and Windesheim can be seen as examples of institutions that should actively participate. The studies and information stated above highlight the importance of the dimensions of attitude of the educational institutions and firms regarding the concept 'mutual contact' in the conceptual framework.

I.III Theoretical knowledge

According to Basant and Chandra (2007), educational institutions interact with firms in a cluster in four main ways: labour market related, demand and supply of goods, services or creation of new firms, and acquisition of knowledge. Clusters are known for their relatively large labour market pools, because a relatively high number of students and professionals are attracted to the region. From the educational point of view, the educational institutions attract professionals and experts in the field who can bring new knowledge and innovation to the cluster's region. According to Basant and Chandra (2007), educational institutions show linkage with the cluster through the creation of spin-offs. According to Investopedia, a spin-off is defined as: "the creation of an independent company through the sale or distribution of new shares of an existing business or division of a parent company" (Fontinelle, 2021). The main linkage between educational institutions and the cluster focuses on the acquisition and spread of knowledge. This linkage comes in various forms, for example: student projects, technology licensing, consulting, industry-institution research and development projects, seminars, workshops, guest lectures, specialised training programmes and internships (Basant & Chandra, 2007).

Burdakova and Byankin (2019) have shown that small innovative businesses linked to a university positively influence cluster initiatives in an industry region. They have found that R&D conducted by higher education institutions is introduced into the industry most of the time (Burdakova & Byankin, 2019). This indicates the transfer of theoretical

knowledge within a cluster. When translating this to the context of this research, it can be said that research and development performed by the educational institution(s) should contribute to the cluster.

Nielsen and Cappelen (2014) have emphasised the importance of mutual interest when an educational institution and a firm are in contact regarding the transfer of theoretical knowledge. The appropriate knowledge should be acquired related to a specific task, project or process. This acquisition is best assisted by collaborations based on trust and mutual interest for common knowledge development (Nielsen & Cappelen, 2014). Mutual contact between the educational institutions and firms in a cluster could, therefore, be influential for the connection and contribution of the educational institutions.

II.IV Student (practical) knowledge

Most of the previously discussed studies focus on collaboration with higher vocational education or universities. Karlsen and Lund (2019) have argued that the working sector also relies on knowledgeable practitioners to remain innovative and competitive. They have concluded that a combination of synthetic and analytic knowledge is necessary for innovation. New technologies are expected to rely more on those within a firm with more analytical knowledge. For successful implementation of these new technologies, however, the synthetic knowledge possessed by practically skilled workers is essential (Karlsen & Lund, 2019). For LCF, this finding could indicate that the connection of both Windesheim's analytical knowledge and ROC Flevoland's synthetic knowledge is of importance to achieve the maximum connection and contribution by the participating educational institutions in the cluster.

Witte and Kalleberg (1995) have nuanced the generally adopted perspective by stating that the fit between vocational education and employment varies across career stages. Vocational education ought to be more important as a source of practical skills early in the career of an individual, which will erode over time, as original training gradually becomes obsolete (Witte & Kalleberg, 1995). They have stated that other sources of human capital, such as work experience and on-the-job training, accumulate. A good fit of (intermediate) vocational education to the employment or firm is solely an early career phenomenon, and general skills and socialisation are more important factors for graduates of vocational education (Witte & Kalleberg, 1995).

It is suggested that there is a major impact of vocational education on industry, whereas Olazaran et al. (2018) have shown that three quarters of the firms in their sample group had relationships with vocational schools. These relationships primarily comprise classic functions that relate to the provision of qualified human resources, for example,

receiving internships (Olazaran et al., 2018). According to Olazaran et al. (2018), the relationship regarding theoretical knowledge transfer between firms and vocational institutions is growing and occurs in the continuation of education to employees and the development of technology and innovation. However, Olazaran et al. (2018) have indicated that the collaboration beyond the classic functions differs significantly between large firms and SMEs, since larger firms have more capacity and departments that can organise workforce enlargement, training needs and projects. Olazaran et al. (2018) have also emphasised that firms should strengthen their relationship with vocational education to obtain an advantage via the recruitment of human resources and their practical skills that suit their needs and that improve their capacity to absorb knowledge. Besides the firms' initiatives, the government should facilitate this type of collaboration through promoting the educational institutions as providers of customised training for firms, exchange residencies between firms and vocational education institutions, and promoting aid for collaboration (Olazaran et al., 2018). This would enhance the connection of practically oriented students to firms.

The presence of workers who have completed vocational education and, therefore, possess particular practical skills has a significant positive effect on innovation activities within a firm (Albizu et al., 2017). More than half of the firms experienced significant participation of vocational education-based students and workers in innovation regarding day-to-day processes within a firm, such as process improvement and product improvement (Albizu et al., 2017). This illustrates that vocational education contributes to the firms, and that the connection with educational institutions does not solely occur due to research and development.

Terentyeva et al. (2018) have stated that the competition in the labour market constantly increases and due to high technological developments, skills rapidly outdate. It is important that vocational education constantly acquires new competencies that are demanded by the labour market (Terentyeva et al., 2018). Terenyeva et al. (2018) have emphasized that the cooperation between vocational education system and the labour market is highly important for good connection and contribution of the educational institutions to the work field.

Internships are thought to be fruitful for the acquisition of new knowledge and educational connection with industry (Amorim et al., 2012). All respondents in the research by Amorim et al. (2012) considered the internship to be fundamental for the link and transition between the educational institutions and the practice of work. Findings by Cunningham and Link (2015) have shown that research and development (R&D) should

be prioritised within educational institutions to develop effective access to business in the educational institutions' sector of interest, that is logistics. Educational institutions can enhance their positions with existing R&D collaborations and through developing new R&D collaborations (Cunningham & Link, 2015).

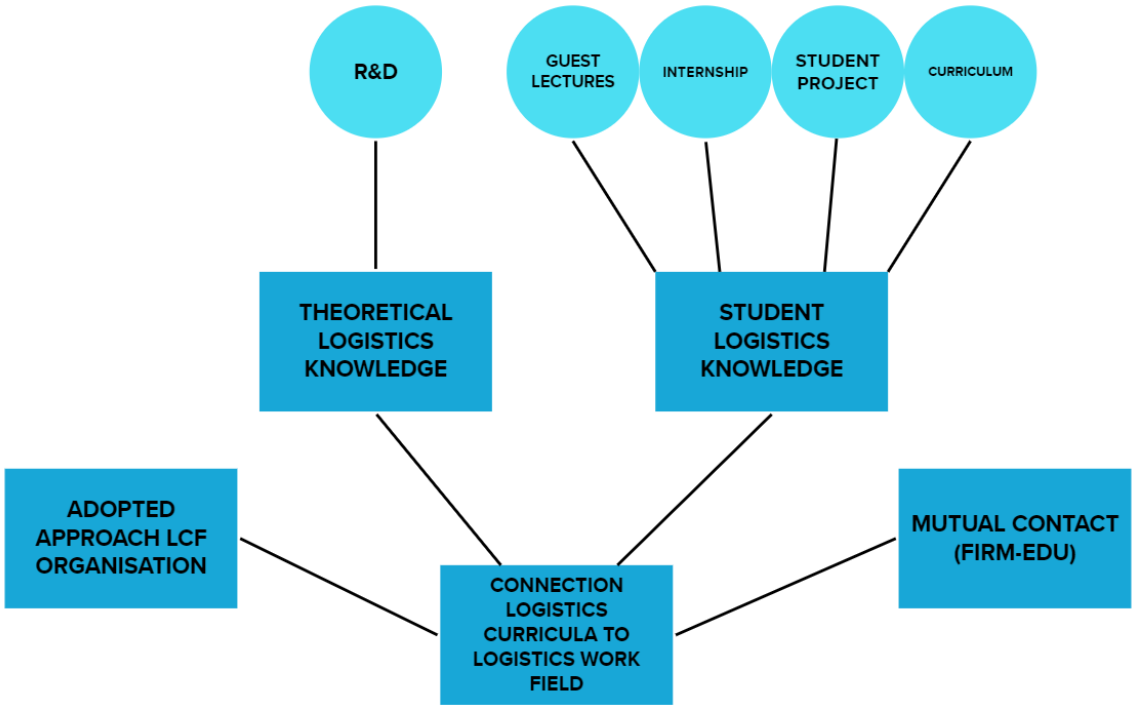
Guven and Uysal (2010) have emphasised the importance of student projects within educational courses to connect with industry practice. According to Guven and Uysal (2010), the majority of the respondents in the study agreed that student projects educate students on the connection between research, study and practice. Students tend to develop better research planning and independent skills, that can be applied in business, after completing a student project (Guvsen & Uysal, 2010). Activities, such as student projects, actively provide opportunities for students to use their knowledge in practice (Guvsen & Uysal, 2010). This enhances the link with practice and strengthens the students' capabilities with day-to-day business in a firm, thus, the link with the curriculum at the educational institution. Tochacek et al. (2016) have strengthened the above findings by stating that student projects significantly affect the quality of the educational process. Results have shown that successful implementation of student projects with a connection to the real world positively influences the connection of students regarding (new) knowledge within the business sector (Fertalj et al., 2013). Student projects have a positive effect on the motivation and engagement of students in practice-based learning and industry-based learning (Chandrasekaran et al., 2012). They not only benefit the students but also the industry, since the students experience a stronger link with the industry.

II.V Conceptual framework

Within the conceptual framework, attention is also paid to the potential impact of the role of the LCF organisation, because it is a kind of overarching factor within the collaboration between the educational institutions and the companies. No specific literature on this has been published, except for the ambitions and goals of the LCF organisation and the participating members, which have already been discussed in the introduction. For this reason, the role of the LCF organisation is included in the further analysis.

Figure 2

Conceptual Framework



II.VI Operationalisation

The conceptual framework was divided up into five main aspects ‘theoretical logistics knowledge, ‘student logistics knowledge’, ‘mutual contact’, ‘adopted approach LCF organisation’ and ‘connection logistics curricula to logistics work field’. These concepts are used to further explore the connection and collaboration between educational institutions and firms, specifically focusing on how educational institutions connect to the firms’ day-to-day business within the LCF. The parties in the collaboration are the educational institutions Windesheim and ROC Flevoland, the participating firms within the LCF, and the municipalities of Zeewolde, Almere and Lelystad. The concept ‘theoretical logistics knowledge’ is explored quantitatively using an online survey, through questions regarding research and development (R&D). The other smaller circle concepts ‘guest lectures’, ‘internship’, ‘R&D’, ‘student project’, and ‘curriculum’ quantitatively explore the concept ‘student logistics knowledge’ through the same online survey. The existing literature, see *II. Literature review*, discusses these concepts as being relevant to the theoretical and student (practical) knowledge. The concepts ‘theoretical logistics knowledge’ and ‘student logistics knowledge’ are also included in the conducted interviews, to analyse them extensively. The other concepts ‘adopted approach LCF organisation’ and ‘mutual contact’ are also explored qualitatively, through the semi-structured interviews. All of the concepts are analysed with regards to the connection of logistic curricula at Windesheim and ROC Flevoland to the logistics work field in Flevoland.

The concepts ‘theoretical logistics knowledge’ and ‘student logistics knowledge’ were the main concepts explored quantitively through the student’s perceptions, views and experiences of the influence of guest lectures, workshops, internships, research and development, student projects and technology licensing on the logistics knowledge within their complete logistics curriculum. The concepts were examined amongst students of logistics-related studies at the educational institutions ROC Flevoland and Windesheim. The online survey contained 29 Likert-scale statements and questions on the provided concepts and their perception of the connection between the activities and content of the curriculum and the logistics work field. The perception of students regarding the presence and strength of the given concepts was explored using descriptive statistics from the survey data. Based on the examined literature, it is expected that the stronger a given concept is present within an educational institution’s curriculum, the stronger the connection between the logistics curriculum and the firm’s day-to-day business is. It is expected that the educational institutions have two main ways of contributing to the logistics cluster: via the input of theoretical knowledge and through the input of well-educated students.

As stated above, the concept ‘student logistics knowledge’ is expected to be influenced by the students’ experience with the regular curriculum, student projects, guest lectures, and internships. Subsequently, it influences the connection to the logistics firms in the cluster. Again, it is measured through the ideas, perceptions and perspectives of the educational institutions, municipalities and the firms. The concept explores the presence of students and graduates at the educational institutions, Windesheim and ROC, who have developed or are developing relevant theoretical and practical knowledge that are demanded by the day-to-day business in firms within the LCF. The concept ‘theoretical logistics knowledge’ is expected to be influenced by the R&D performed at the educational institution. This concept is incorporated in both the interviews and online survey.

The concept ‘mutual contact’ is expected to exert a certain influence on the connection of the educational institution’s logistics curriculum to the firms in the logistics cluster. Similarly, the concept is explored through the ideas, perceptions and perspectives of the educational institutions, municipalities and the firms by conducting interviews. In the literature review section, it is stated that mutual contact and attitudes of all participating parties are of major importance to a valuable collaboration. Therefore, the adopted and perceived attitudes by the firms, educational institutions and the municipalities are observed and explored in the interviews with regards to the linking of the educational institution’s curriculum with the logistics business practice.

The concept ‘adopted approach LCF organisation’ is expected to also exert a certain influence on the connection of the educational institution’s logistics curriculum to the firms day-to-day business in the logistics cluster. This concept is explored through the ideas, perceptions and perspective of the educational institutions, municipalities and the firms. As mentioned in previous sections, the organisation of the LCF wants to facilitate logistics firms and related parties by connecting them and solving logistical issues (OMALA, 2021). This shows that the adopted approach of the LCF organisation is expected to positively influence collaboration between the educational institutions and the logistics firms. The potential influence of the LCF organisation is, therefore, explored in the interviews.

The concept ‘connection of logistics curricula to logistics work field’ is explored through the results of the semi-structured interviews and the descriptive statistics of the survey data. In the conceptual model, it is expected that the concepts ‘theoretical logistics knowledge, ‘student logistics knowledge’, ‘mutual contact’, ‘adopted approach LCF organisation’ influence the connection of the logistics curricula at ROC and Windesheim to the day-to-day business in the cluster. Interrelationships between the concepts provided in the conceptual framework are not further examined, whereas the formulated research question focusses on the influence of the given concepts on the connection of the logistics curricula to the logistics work field. Future research could study interrelationships between the concepts ‘mutual contact’ and ‘student logistics knowledge’ for example.

III. Methodology

This section comprises two main parts: discussion of methodological structures in previous studies and clarification of the methodological choices made for this study.

III.I Methodological structures in existing studies

Perkmann et al. (2011) have argued that the effectiveness of collaboration should be assessed on qualitative judgements of representatives from both parties in an alliance. Therefore, representatives from educational institutions, firms and municipalities were included in the interview sample for this study. Within the semi-structured interviews, assessment of the collaboration and connection between the educational institutions and the firms was discussed. Impact can be explored by gathering information and judgements on benefits, networks within academic and industrial communities and potential adoption of new techniques, such as academic spin-offs (Perkmann et al., 2011). The semi-structured interviews, therefore, incorporated these topics into discussion. According to Chedid et al. (2020), mutual contact between parties and their attitudes should be uncovered through direct discussion of mutual networking and motivations.

Velinova et al. (2020) have stated that the business to academia collaboration in logistics is based on motivations, forms of interaction and outcomes of the collaboration. These topics were also incorporated in the structure of the interviews in this research and discussed in relation to the connections between the logistics curricula at Windesheim and ROC Flevoland and day-to-day business in the logistics cluster. The main purpose of the semi-structured interviews is to outline the relationship, connections and characteristics of the interaction between the educational institutions and the firms. Exploration of the data was based on an extensive description of these aspects (Velinova et al., 2020). Examination of the survey data was based on descriptive and mean statistics due to the relatively small sample size, since statistically significant analysis was not possible.

Alexander and Miller (2017) have stated that university-industry theoretical and practical knowledge transfer concerns a wide range of activities, both formal and informal. A semi-structured interview provides better possibilities to access the more informal aspects and was therefore preferred. Perkman et al. (2011), Vesperi et al. (2021), Kaklauskas et al. (2018) and Franco et al. (2019) have all argued that the attitude of both the firms and educational institutions should be closely analysed regarding mutual contact and interaction, since this provides insight on the effect it has on the connection and contribution of educational institutions regarding firms' business. A semi-structured interview provides good opportunity to extensively analyse mutual contact, since the respondent can formulate the answer himself.

On methodological choices, Nielsen and Cappelen (2014) have suggested that respondents should represent different categories, such as researchers, company representatives and students, based on their involvement in the collaboration. Therefore, the municipalities of Almere, Zeewolde and Lelystad, the educational institution representatives and the participating firms were purposefully selected for the sample for the semi-structured interviews. According to Johannessen et al. (2009), this is a tactic selection. The respondents provided a balanced insight into different perspectives on the collaboration. This approach has also been emphasised by Olazaran et al. (2018) who have indicated that an extensive analysis is advisable on the perceptions of a vocational school and their students since that can effectively target the vocational school. Both the students and the representative of the intermediate vocational school ROC Flevoland were incorporated in the analysis of this research. This highlights one motive for the mixed-methods structure in this study. It was not possible to conduct many interviews with students who were following the logistics study programmes at ROC Flevoland and Windesheim. To include the students' viewpoint, an online survey was shared with all the students. This generated quantitative data that was used for the exploration of the descriptive statistics, based on students' experience, perceptions and visions.

III.II Methodological approach in this research

This study adopts a mixed-methods approach. Qualitative and quantitative methods were combined through an online survey and eight semi-structured interviews. The online survey was conducted amongst 58 students at ROC Flevoland and Windesheim, who were following a logistics-related study programme. The semi-structured interviews were conducted with representatives at the educational institutions of Windesheim and ROC Flevoland, aldermen of economic affairs at the municipalities of Almere and Zeewolde, and the participating logistics firms in the LCF.

Sampling method

The interplay between the qualitative and quantitative aspects increased the breadth and depth of understanding the connection between the logistics curricula and the day-to-day logistics business. The interviews explored the views of the logistics firms, municipalities and representatives at ROC Flevoland and Windesheim. The interviews were semi-structured, which allowed for some structuring with regards to the topics and some main questions. Due to this structure, the interviews could explore the views of the respondents regarding mutual contact, theoretical knowledge, student (practical) knowledge and the adopted approach of the LCF organisation. Therefore, Sub-questions 2, 3, 4 and 5 could be explored in more depth. The online survey provided the opportunity to include the views, perceptions and experiences of a relatively large number of logistics

students. This increased the data on student perceptions and views on the connection of their logistics curriculum to the logistics day-to-day business. It was beneficial to the research results, which included the ‘product’ delivered by the educational institutions’ logistics curricula through which they mainly connect to the logistics firms. Therefore, Sub-question 1 could explore the perception and views of students more in-depth.

The sampling choice expanded the number of perspectives considered in the research. Using a mixed-methods approach allowed the research not to be limited to the exploration of views from the logistics firms and the ‘plan makers’, that is the municipalities and the representatives at the educational institutions. The views of logistics students were also included, and provided insights into the implementation or realisation of the collaboration. Due to this sampling choice, the agreements and goals of the collaboration and connection between the educational institutions’ representatives, municipalities and logistics firms could be examined. How students experience the implementing and bringing about of certain agreements and goals could be reviewed. The sample enabled the possibility of triangulating the interview results with the survey results to increase the validity and reliability of the research. The methods complemented each other. The interview results could elaborate, validate or further clarify specific results within the online survey, or vice versa. Therefore, the interplay between the quantitative and qualitative method was meaningful for an extensive exploration of the connection between logistics curricula and day-to-day business in the LCF.

Quantitative method

An online survey was conducted on the perceptions of logistics students on their curriculum and its link to logistics day-to-day firm business within the LCF. The online survey was solely conducted amongst students, since they were expected to provide the best insight into the curriculum in practice and its link to the work field regarding the logistics business sector.

As stated beforehand, the quantitative method was pursued through a survey amongst students from the educational institutions of Windesheim and ROC Flevoland. The survey was solely conducted amongst students on logistics-related study programmes. At Windesheim, these programmes were Logistics Engineering, Logistics Management, Logistiek, Ruimtelijke Ontwikkeling – Mobiliteit and Technische Bedrijfskunde (Hogeschool Windesheim, 2022). At ROC Flevoland, the programmes were Chauffeur Goederenvervoer, Logistiek Medewerker, Logistiek Supervisor and Logistiek Teamleider (ROC Flevoland, 2022). These specific curricula were selected according to the educational institutions’ own classifications. The respondents were varied, as much as

possible, in age, gender, background, and educational level, as these factors could influence the views on the experienced connection with the LCF. Through conducting the survey, insight was gained into the perceptions of students on their connection to day-to-day business in the LCF.

Using the online survey results, the quantitative method helps answer the first sub-question: '*How do students perceive the connection of the curriculum with the day-to-day business in logistics firms?'* The results show how students rate the link of their curriculum to the logistics work field. Students also had to rate the influence of guest lectures, R&D, internships, and student projects on their connections with the logistics work field. These concepts were all scored on a 5-point Likert scale. This specific scale was chosen for a number of reasons. Firstly, the survey respondent group consists of students between the age of approximately 16 to 22 years old, it is expected that some do not have extensive experience with filling in online surveys. The 5-point scale is relatively easy to understand for survey respondents. Secondly, it is also expected that the students are more likely to fill in a form that takes relatively less time, specifically because there is no face-to-face contact between the surveyor and the respondent due to the survey being online. Using a 5-point scale takes less time to fill in than higher-point scales. Thirdly, it is expected that students fill in the online survey using their mobile phones. A 5-point Likert scale fits mobile device screens better and offers clear choices without the respondents becoming overwhelmed.

The respondents of the survey specified their level of agreement with the presence of given concepts. This was effected by making use of the following five points: 1 Strongly disagree, 2 Disagree, 3 Neither agree nor disagree, 4 Agree, 5 Strongly agree. The StataSE 17 programme was used to obtain descriptive statistics. As added above, the Likert scale data were converted to numerical data to obtain the descriptive statistics.

If the presence of a given concept scored below the value of 3, on average, it was deduced there was no significant influence of a given concept on the students' connection with the work field. If a given concept had a value above 3, on average, it was perceived as exerting a positive influence on the student' connection to the logistics work field. If the student's connection was positively influenced, it could be concluded that the connection of the logistics curriculum content with the logistics firm's business was strengthened.

The online survey received 58 respondents. The limited sample size was the result of a resource constraint. The educational institutions of Windesheim and ROC Flevoland were not able to provide any information for direct contact with the students. The survey was, therefore, published on the student platforms of both educational institutions. The

number of respondents was dependent on how many students were voluntarily willing to complete the survey. The full survey can be found in *Appendices I*. To motivate the students to complete the survey, a voucher giveaway was included. The respondents of the survey were approximately equally divided between the institutions with 52% from Windesheim and 48% from ROC Flevoland. The relatively low sample size provided a valid result for the quantitative part of the research, due to the approximate equal amount of ROC Flevoland and Windesheim respondents.

Building upon the existing literature discussed in the previous section *II. Literature review*, the concept of internship was divided into two main categories in the survey questions of 'internship practice' and 'internship theory'. The variable 'internship practice' provided data on how students perceive the development of their practical skills during their internships. The other variable, 'internship theory', provided data on how students perceived their gain in theoretical knowledge during their internships.

Qualitative method

The qualitative methodology focused on semi-structured interviews that were conducted with three main groups: the educational institutions, the participating firms and the municipalities. The group of educational institutions were ROC Flevoland and Windesheim, and representatives from both participated in an interview. The group of participating firms that were interviewed were Axflow BV (a large carrier of installations); Plukon Convenience (a salad meal producer and distributer); ASF Fischer (a distributor of building materials); and Westover BV (hard- and software for logistical processes). The municipalities representatives who participated in an interview were de Jonge, alderman of economic affairs Zeewolde and alderman of economic affairs Lelystad Elzakalai. Except for the interview with the representative of Windesheim, all interviews took place through face-to-face contact. The interview with Kees Stolwijk, representative of Windesheim, was conducted digitally via e-mail. Face-to-face contact was preferred in the interviews to enable the respondent to express and communicate in the best way possible. The qualitative data took all participating parties into account. This allowed the data to avoid being one-sided, and things said or claimed by the educational institutions could be checked with the participating firms and municipalities, or vice versa.

The interviews were conducted to explore the concepts regarding mutual contact between the firms and the educational institutions, the flow of theoretical knowledge, the flow of student knowledge and the adopted approach of the LCF organisation. The semi-structured construction of the interviews gives the respondent the possibility to elaborate on the topics of interest. A diversity of respondents was important for the interviews.

Therefore, the aldermen of economic affairs of the municipality Almere and Zeewolde, the representatives of ROC Flevoland and Windesheim and four participating firms in the LCF were interviewed. The interviews lasted for approximately 30 to 40 minutes. The interview guide is included *Appendices II*. A common thread throughout the interview guide were the following concepts: ‘mutual contact’, ‘adopted approach of the LCF organisation’, ‘theoretical knowledge’, and ‘student knowledge’. A more detailed description of these concepts can be found in the discussion of operationalisation in *II.VI Operationalisation*.

The concepts stated above were explored through semi-structured interviews with representatives from the logistics firms, ROC Flevoland and Windesheim, and the municipalities of Almere and Zeewolde. This selection covered a mix of LCF initiators and partners (see *I.I Background*). Within these interviews, the perceptions, experiences and views of the respondents were discussed, including how a firm perceives the connection with the educational institutions, internships, and the knowledge of graduated students. The interviews were semi-structured, drawing on the conceptual framework, to grasp how the logistics curricula connect with the firms’ business and how the influence of the LCF organisation, mutual contact, the flow of theoretical knowledge and student (practical) knowledge were experienced. The concepts were briefly introduced with a few open questions. Further questions and answers depended on the response of the respondent. The interviewee mainly focused on listening and answering follow-up questions that allowed the respondent to explain their responses in as much detail as possible. This increased the extensiveness of the interview results for answering the main and sub-questions.

The interview transcripts were explored by examining quotes and through coding of text fragments using the programme Atlas.ti 22. They were transcribed and coded to investigate the main perceptions, experiences and views of the respondents on the connection of the logistics curricula at the educational institutions to the logistics work field. The coding scheme can be found at the end of the document (see *Appendices IV*). The interview transcripts were coded in a deductive method, using the four main concepts in the conceptual framework related to the qualitative part of the research: mutual contact, theoretical knowledge, student (practical) knowledge and role of the LCF. However, if the interviews contained any surprising new aspects, these were coded using an inductive approach. In a second stage the codes that were created due to inductive coding were grouped, see *Appendices IV*. The interviews were semi-structured and therefore offered the possibility for this type of coding. In total, 45 individual codes were applied to the interview transcripts (see *Appendix III Code book*). These codes were grouped into the following code groups: ‘Attitude Educational Institutions’, ‘Attitude Firms’, ‘Attitude LCF

organisation', 'Logistics knowledge', and 'Challenges'. The code group 'Challenges' was added due to the inductive coding process, since respondents frequently referred to specific challenges they observed within the LCF collaboration.

Using quotes that provided good representation in code groups and codes, helped formulate adequate answers to Sub-questions 2, 3, 4 and 5. These sub-questions ask for an extensive exploration of mutual contact, the flow of theoretical knowledge, the flow of practical skills, and the role of the LCF organisation within the collaboration. Building on these specific concepts, quotes explained and illustrated their influence regarding the connection between the logistics curricula and the logistics work field.

The quantitative method provided insight into the extent of the logistics curriculum's connection with the business of the logistics firms. The qualitative method provided insight on how this connection is perceived by the firms, educational institution representatives and municipalities. The interviews with the educational institutions' representatives, firms and municipalities explored the influence of theoretical knowledge, student (practical) knowledge, mutual contact and the adopted approach of the LCF organisation. The discussion in Chapter V reflects on the results and formulates a brief summary of the connection of the logistics curricula with the firms' business in the LCF.

III.III Reliability and validity

In this section, the reliability and validity of the mixed-methods research is discussed. The mixed-methods approach entailed the combination of a quantitative method and a qualitative method. The research methods consisted of an online survey amongst students and multiple interviews with firm, municipality and educational institution representatives. The aim was to ensure that validity and reliability were as high as possible, given the research context.

Regarding the validity of the research, there was a specific focus on triangulation, member checks, peer examination and research bias. According to Zohrabi (2013), these factors, amongst others, play major roles in the validity of research. The research data were collected from more than one source, through interviews and an online survey. The collection of data through one source can be questionable and biased. Therefore, within this research, preference was given to the collection of information through a variety of sources and with a variety of techniques. This research used descriptive statistics and deductive and inductive coding. This facilitated the possibility of confirming findings. By applying triangulation, it was possible to compare and validate qualitative results with quantitative results, to compare survey results with interview results. If the same results were obtained, there was more assurance that the data were valid. Through member

checks, the result and interpretations were confirmed and validated with the participants (Zohrabi, 2013). This was applicable to the qualitative part of the interview, where the interviewer repeatedly asked the respondent: "*If I'm interpreting correctly, do you mean the following …?*" In this way, the interviewer could confirm the content of what the respondent had stated during the interview. According to Zohrabi (2013), the plausibility and truthfulness of information can be recognised and supported through this check. During the interviews, the respondents agreed with the interviewer's addressing of the above-stated question, however there were some examples where the respondent reformulated their answer. This process ensured that the results and interpretation were as precise and correct as possible, and, therefore, increased validity. The research data exploration and interpretation were peer examined. The peer review of the plausibility of the data exploration and interpretation significantly increased the validity of the research. The research bias was taken into account with regards to the research validity. In the data exploration and interpretation, the researcher tried to collect, explore and interpret the data as impartially as possible. Throughout the research process, the researcher aimed to remain as nonjudgmental and clear as possible. The researcher adhered to ethical rules and principles, performing the exploration and interpretation as accurately as possible and reporting the findings honestly (Zohrabi, 2013).

The semi-structured interviews were conducted amongst two aldermen from the municipalities Lelystad and Zeewolde, the representative of Windesheim, the representative of ROC Flevoland and four participating firms. This specific distribution of respondents increases validity, since the municipalities, firms and educational institutions are represented by at least more than one respondent. The online survey was conducted amongst 58 students from Windesheim and ROC Flevoland combined. Approximately an equal amount of students from Windesheim and ROC Flevoland participated in the survey, 52% and 48% respectively. To further increase the reliability and validity of the research, the number of respondents could be increased.

Regarding the reliability of the research, there is specific focus on triangulation, the choice of participants, methods of data collection, data interpretation, and the recording of the data. Finding identical results is demanding and difficult for qualitative approaches (Zohrabi, 2013). The qualitative data were in narrative form and subjective. Most of the formulated sub-questions in the research were dependent on qualitative data. Within this data collection and interpretation, the main focus was on the consistency and dependability of the results and findings. Triangulation played an important role here, too. The collection of varying information from different sources enhanced the reliability, and therefore the replication of the study could be carried out relatively easy. This was mainly

due to the incorporation of the views and experiences of students, educational institution representatives, municipality representatives and participating firms. The methodology section (see III.II Methodological approach in this research) describes the data collection and exploration. The quantitative data was analysed by using descriptive statistics and the qualitative data with descriptive interpretations. The detailed description of the methodological approach can help replicate the presented research and therefore enhance its reliability. The methodology also included a brief description of the research participants for both the quantitative and qualitative methods. The brief participant description increases the reliability of the research since it facilitates the replication of the research. With regards to reliability, it is preferred that data is relatively easily observed and quantified, that is counted or measured (Zohrabi, 2013). The questions in the online survey were measured on a 5-point Likert scale and converted to numerical values, which made the quantitative data measurable and relatively easy to replicate. High reliability within qualitative data is more challenging, since it is difficult to observe and measure the perception and experiences of firms, educational institutions and municipalities. The descriptions and explanations within the interviews were as detailed as possible, to ensure that they could be replicated as well as possible. To strengthen the reliability of the interview, they were recorded and saved. A reanalysis or replication of the data would be relatively easy to accomplish. This enhanced the internal reliability of the findings and the qualitative data itself.

IV. Results

IV.I Linking the logistics curriculum with the work field

In this part of the results section, an extensive answer to the following sub-question is formulated: '*How do students perceive the connection of the curriculum with the day-to-day business in logistics firms?'*

Evaluation of the logistics curriculum content and its link with the business of the logistics firms was focused on the number of guest lectures, internships, R&D, student projects and the curriculum related to the logistics sector. These concepts were measured through a survey amongst students of logistics-related studies at the educational institutions of Windesheim and ROC Flevoland. The current literature has stated that the above-mentioned concepts apply to students who are well prepared for the labour market. The survey data indicate the presence and strength of the given concepts. The stronger the presence of a given concept within an educational institution, the stronger the rating for a link between the logistics curriculum and the firms' business.

Tables with descriptive statistics on the concepts of interest are shown below (Tables 1 and 2). The descriptive statistics are shown in two individual tables, because the total number of respondents (N=58) differs from the total number of respondents with internship experience (N=39).

Table 1

Descriptive Statistics on main variables for the Total Sample

Total averages

	N	Mean	Median	Min	Max
Student Projects	58	3.34	4.00	1	5
R and D	58	2.67	2.00	1	5
Curriculum	58	3.19	3.00	1	5
Guest Lectures	58	3.03	3.00	1	5

Table 2

Descriptive Statistics on internships for the Total Sample

Total averages

	N	Mean	Median	Min	Max
Internship Practice	39	4.03	4.00	1	5
Internship Theory	39	3.64	4.00	0	5

As can be seen in *Table 1* above, student projects, R&D, curriculum and guest lectures have a mean value higher than 3. Based on the delimitations stated before, it can therefore be said that student projects, guest lectures and the content of the curriculum

within logistics curriculum at the educational institutions have a positive influence on the connection with the logistics firms' business. Furthermore, R&D showed a mean of 2.67, which is below 3 and indicates that, on average, there is no significant influence of research and development. The potential cause is explained further on in this thesis, when there is a discussion of the educational institutions being approached individually. The concept of guest lectures has a value that is just above 3, namely 3.03>3. This means that, based on the sample, on average, guest lectures have a minor positive influence on the connection with the logistics work field. *Table 2* shows that internships exert positive influence both through the development of practical skills and the gaining of theoretical knowledge. Internship practice scores 4.03, which shows that, on average, the respondents agreed upon a significant development of practical skills due to internships.

Table 3

Descriptive Statistics on main variables for ROC Flevoland Respondents in the Sample

ROC averages

	N	Mean	Median	Min	Max
Student Projects	27	3.04	3.00	1	5
R and D	27	2.15	2.00	1	3
Curriculum	27	3.22	3.00	1	5
Guest Lectures	27	2.89	3.00	1	5

Table 4

Descriptive Statistics on internships for ROC Flevoland Respondents in the Sample

ROC averages

	N	Mean	Median	Min	Max
Internship Practice	17	3.82	4.00	1	5
Internship Theory	17	3.24	3.00	0	5

As can be seen in *Table 3* above, the concepts of students projects and curriculum adopt a mean value that is higher than 3. Based on the delimitations stated above, it can therefore be said that, for ROC Flevoland, student projects and the content of the curriculum within the logistics curriculum at ROC Flevoland have a positive influence on connection with the logistics firms' business. The concepts of R&D and guest lectures show mean scores below 3, which indicates that the students at ROC Flevoland do not perceive any positive impact of guest lectures and research and development regarding their connection to the logistics work field. The results for R&D can be explained relatively easily, since ROC Flevoland has no research and development department. Table 3 also shows there is no single ROC Flevoland respondent who provided an answer above 3 (max=3).

Table 4 shows that, at ROC Flevoland, on average, internships exert a positive influence on the connection with the work field both through the development of practical skills and the gaining of theoretical knowledge. In line with the descriptive statistics of the total sample, on average, the development of practical skills is experienced relatively stronger than the gain in theoretical knowledge for students at ROC Flevoland.

Table 5

Descriptive Statistics on main variables for Windesheim Respondents in the Sample

Windesheim averages					
	N	Mean	Median	Min	Max
Student Projects	32	3.66	4.00	1	5
R and D	32	3.16	3.00	1	5
Curriculum	32	3.19	3.00	1	5
Guest Lectures	32	3.19	4.00	1	5

Table 6

Descriptive Statistics on internships for Windesheim Respondents in the Sample

Windesheim averages					
	N	Mean	Median	Min	Max
Internship Practice	23	4.17	4.00	2	5
Internship Theory	23	3.96	4.00	1	5

As can be seen in *Table 5* above, the concepts of students projects, R&D, curriculum and guest lectures adopt a mean value that is higher than 3. Based on the delimitations stated above, it can therefore be said that, for Windesheim, on average, student projects, R&D, the content of the curriculum and guest lecture within the logistics curriculum at Windesheim have a positive influence on the connection with the logistics firms' business and the work field. When comparing with ROC Flevoland, the results for R&D have switched from no significant influence to a positive influence on average. This can be explained by the fact that Windesheim performs R&D, which is discussed in the interviews in the next section, see *IV.II Theoretical knowledge and student (practical) knowledge*.

Table 6 shows that at Windesheim, on average, internships exert positive influence on the connection with the work field both through the development of practical skills and the gaining of theoretical knowledge. Concurring with the descriptive statistics for ROC Flevoland, on average, the development of practical skills is experienced relatively stronger than the gain in theoretical knowledge for students. However, the results for students at Windesheim showed they experienced the development of practical skills and gaining of theoretical knowledge during internship more strongly (4.17>3.82 and 3.96>3.24).

Table 7

Overall Experience of the Connection Between Curriculum and the Logistics Field of Work

Connection Study Programme-Logistic Firm				
	Mean	Median	Min	Max
Link Programme	2.81	3	1.00	5
Link Programme ROC	2.7	3	1.00	5
Link Programme Windesheim	2.94	3	1.00	4

In *Table 7* above, the descriptive statistics are shown regarding how students perceive the overall connection between the content of their curriculum with the day-to-day business in firms within the logistics sector. As can be seen in the table, on average, a student at Windesheim experiences or expects the connection to be relatively higher compared to a student at ROC Flevoland. However, both mean scores of the educational institutions are below 3 (2.7<3 and 2.94<3). Again, based on the delimitation described above, this means that there is no positive experience or expectation with regards to the link of the curriculum to the logistics work field. It can, therefore, be concluded that the collaboration between the educational institutions and the firms within the LCF has not yet affected the students' perceptions as positive. It is, however, not possible to assess the exact progress that has been made since the LCF organisation was set up, since there is no baseline measurement within this research. Overall, the descriptive statistics show that for both educational institutions, student projects and the regular curriculum are influential. For Windesheim, all analysed variables were influential.

IV.II Mutual contact and attitudes between educational institutions and firms

In this part of the results section an extensive answer to the following sub-question is formulated: '*How does the mutual contact between the firms and the educational institutions influence the connection of the logistics curricula with the day-to-day business in logistics firms?'*

The qualitative data includes a separate interview with the study manager of ROC Flevoland, Martijn Koelewijn. He is a representative of logistics-related studies at this facility of secondary vocational education in Lelystad. This facility is part of ROC Flevoland, which provides the largest number of logistics-related curricula within the educational institutions of ROC Flevoland. The qualitative dataset also contains an interview with the director of Windesheim Almere, Kees Stolwijk. He provides insight into cooperation with the cluster on behalf of Windesheim.

On the other side of the collaboration, there are the firms in the logistics cluster. Their ambitions and experiences are also part of the qualitative data, through interviews

with representatives from four participating firms in the LCF. First, there is an interview with Roy Ziermans, sales manager at Westover BV, a firm that provides hardware and software for the automation of logistical processes. Second, there is an interview with Wim Meiling, logistics manager at Plukon Convenience, a firm producing and distributing meal boxes. Third, the dataset contains an interview with Johan Tjeertes, logistics manager at Axflow DC, a firm that distributes pumps and pump systems. Fourth, the dataset also includes an interview with Taeke Wirl, financial and operational director at ASF Fischer, a firm that distributes a wide range of mounting materials. The firms Axflow DC, ASF Fischer and Plukon Convenience are members of the LCF, whereas Westover BV recently cancelled its membership. Interviewing the participating firms provides insight into the approach and attitude of the firms in cooperation with the educational institutions within the LCF. Below, *Table 8* represents a clear overview of the interviewees and their corresponding institutes or firms.

Table 8

Interviewees and their firm or institute

Interviewee	Institute / Firm
Wim Meiling	Plukon Convencience
Johan Tjeertes	Axflow DC
Roy Ziermans	Westover BV
Taeke Wirl	ASF Fischer
Egge-Jan de Jonge	Economic affairs municipality Zeewolde
Adam Elzakalai	Economic affairs municipality Lelystad
Kees Stolwijk	University of Applied Sciences Windesheim
Martijn Koelewijn	ROC Flevoland

The attitude of the educational institutions with regards to their ambitions were mostly similar for ROC Flevoland and Windesheim. Elzakalai, alderman of economic affairs Lelystad, stated that both educational institutions adopted a proactive attitude. Both educational institutions were amongst the first to participate as soon as the first words about the operation of the LCF were out. This revealed the ambition of both educational institutions to connect with the cluster in general. Elzakalai also stated that both educational institutions directly contacted the municipality of Lelystad with regards to other large developments of the business park and industrial area at the Flevokust. Subsequently, both educational institutions wrote a letter of commitment to the municipality of Lelystad to connect with the logistics cluster, organise internships, and supply and deliver employees for the future. This indicates the general proactive attitude of both educational institutions.

The proactive initial attitude of Windesheim and ROC Flevoland was also confirmed by the participating firms in the cluster. Taeke Wirl, logistics manager at ASF

Fischer, stated that ROC and Windesheim have always joined the meetings of LCF. They have also organised ‘knowledge sessions’ themselves for the educational institutions and the firms in the cluster. However, Taeke Wirl emphasised that the number of meetings was limited. Roy Ziermans, sales manager at Westover BV, confirmed the relatively low intensity of contact with both educational institutions and the other firms in the cluster. Wim Meiling, logistics manager at Plukon Convenience, stated that the real contact between the firms and the educational institutions was relatively low in the starting phase of the organisation of the LCF.

A next step after revealing the ambition to connect was to get into contact with the parties of interest. The attitude concerning mutual contact between the educational institutions and the participating firms differed according to the educational institution. Egge-Jan de Jonge, alderman of economic affairs Zeewolde, stated that Windesheim had a proactive attitude in contacting the cluster organisations. There were several meetings to set up the LCF. De Jonge stated:

> *De lector aan Windesheim zeg maar, die nauw betrokken was bij, uhm, eigenlijk bij het hele logistieke cluster en de ontwikkelingen … en daar zit eigenlijk deze lector bij aan tafel, en zorgde ervoor dat die afspraken bij hun meteen weer goed in de agenda’s terecht kwam. [The professor at Windesheim, let's say, who was closely involved in, uhm, actually in the entire logistics cluster and the developments... and this lecturer is actually sitting at the table with them and ensured that those appointments were immediately put in their agendas.] (Frehé, 2022)*

This comment shows the proactive attitude of Windesheim, since their lecturer in logistics was present at those meetings. This ensured that, from the start of the LCF, Windesheim was well integrated and aware of the goals and appointments within the cluster cooperation.

Furthermore, de Jonge also indicated the different attitude of ROC Flevoland in this mutual contact with the cluster. ROC Flevoland was less coordinated, because of the multiple locations they occupy at Almere Buiten, Almere Poort and Lelystad (ROC van Flevoland, 2022). Martijn Koelewijn emphasised that ROC Flevoland has been more actively participating in the logistics cluster for approximately a year now. He stated that, in the first year, ROC Flevoland was only part of the organisation as a sparring partner, however, in the last year, they have focused on closer ties with the cluster through increasing contact with the work field and the participating firms.

Taeke Wirl, financial and operational director at ASF Fischer, confirmed that the mutual contact between the educational institutions and the cluster differs. ROC Flevoland

has contacted him about internships, whereas this is not the case for Windesheim. ROC Flevoland took the initiative for contact here, whereas Windesheim did not take this initiative. Wirl emphasised that the overall mutual contact is relatively disappointing, indicating there is no real further contact, besides occasional contact with regards to internship by ROC Flevoland.

Axflow DC and ASF Fischer concluded that the mutual contact between the firms in the cluster and Windesheim was still insufficient. Johan Tjeertes, logistics manager at Axflow DC, mentioned that there had been contact between Axflow and Windesheim that dated back several years. He added that the amount of connection with Windesheim was relatively low, since Axflow focuses on secondary vocational education. Kees Stolwijk, director of Windesheim Almere, stated

> *Contact verliep grotendeels via de projectleider, waardoor het rechtstreekse contact tussen logistieke bedrijven en onze opleidingen nog onvoldoende van de grond komt. Met het positioneren van onze relatie manager en haar in contact te brengen met het LCF verwachten we dit punt snel te verbeteren. [Contact was largely through the project leader, which means that direct contact between logistics companies and our training courses is still insufficient. We expect to improve this point quickly by positioning our relationship manager and bringing her into contact with the LCF.] (Frehé, 2022)*

In the above quote, Stolwijk stressed that the contact between Windesheim and the participating firms in the cluster is still insufficient, but that they will act more proactively by positioning a relation manager to increase the mutual contact with the firms in the cluster.

The ambitions of the firms are relatively similar with regards to cooperation with the educational institutions. All the interviewed firms hoped to receive students from the educational institutions that they could predominantly teach through internships. Tjeertes also stated that he is very pleased he might receive students and teach them inside his company. He said he is willing to deliver compensation through workshops or guided tours to connect with students from the logistics curriculum. Ziermans added that Westover BV had the ambition to act as a training company. He stressed that, due to the nature of Westover BV, they were working in a diverse list of market segments. He expected this to be interesting for students. Koelewijn indicated that the SMEs and family businesses often have a traditional production process, without further digitalisation or automation. This caused these firms to limit their ambitions and goals to solely focus on recruiting physical workforce—hands and feet in the warehouses, since this is needed most within these

firms. In line with these ambitions, both Plukon Convenience and ASF Fischer hoped the cooperation would bring an influx of logistics employees.

The firms based their attitude on their ambitions to a significant extent. Wirl emphasised that ASF Fischer has contacted the educational institutions to gain a better understanding of the schedules of the curriculum. The firm was interested to know when students were finished with their curriculum and when, in the year, they have space to do an internship, for example. Wirl also said that ASF Fischer was interested in both physical and theoretical input from the educational institutions. Regarding the mutual contact between the educational institutions and the firms, he stated,

Het zou mooi zijn als er een paar bijeenkomsten waar die scholen ook aanwezig zijn. Dat zij kunnen vertellen waar ze mee bezig zijn, dat zij vragen aan ons kunnen stellen die ze willen stellen, dat ze kunnen aangeven wat zij belangrijk vinden dat die studenten mee krijgen tijdens hun studie, maar ook dat wij iets meer zicht hebben op hoe ziet die studie er nou uit, wanneer zijn de stagemomenten, wanneer zijn er andere momenten die belangrijk zijn als bedrijf, waar wij misschien onze bijdrage kunnen leveren. Onderdelen van die studie waarbij wij kunnen aanhaken, of dat ze een keer hier kunnen kijken. [It would be nice if there were a few meetings where those schools are also present. That they can tell us what they are working on, that they can ask us questions they want to ask, that they can indicate what they think is important that students learn during their studies, but also that we have a little more insight into how that study is done, when are the internship moments, when are there other moments that are important as a company, where we might be able to make our contribution. Parts of that study that we can join in, or that they can take a look here.] (Frehé, 2022)

Wirl categorised ASF Fischer as proactive with regards to cooperation with the educational institutions. The firm intended to connect well with the educational institutions. Wirl emphasised that the approach to ROC Flevoland should be different compared to the approach to Windesheim. According to Wirl, mutual contact with ROC Flevoland should primarily focus on the potential supply of physical workforce, whereas the mutual contact with Windesheim could primarily focus on more theoretical aspects, such as logistics data analysis with internships. The actual contact between the firms and the educational institutions is limited to sporadic contact about internships. Based on Wirl's vision, there is more that can be achieved through increasing mutual contact.

Tjeertes communicated he was willing to give a guided tour or workshops at the educational institution on behalf of Axflow DC. He also stated that the mutual contact should come actively from both sides. According to Tjeertes, firms should offer internships, but educational institutions should also seek rapprochement with the firms. He

gave the example that Axflow DC had offered to give guest lectures or workshops, but this suggestion had so far not gotten off the ground.

As discussed before, Meiling elaborated that higher vocational education, such as Windesheim, has closer ties with the business, since this educational institution has certain professors who perform in business too. Meiling stated the following regarding this conception:

De samenwerking tussen onderwijs en bedrijven kan veel beter … als je een docent hebt, die niet uit het bedrijfsleven komt, dan weet hij denk ik minder goed wat er in het bedrijfsleven speelt, en dat is logisch. Uhm, dus daar zul je iets voor moeten verzinnen. [The collaboration between education and business could be much better... if you have a lecturer who is not from the business world, then I think they are less aware of what is going on in business, and that is logical. Uhm, so you'll have to come up with something for that.] (Frehé, 2022)

He emphasised that the cooperation and connection of educational institutions with firms in the logistics cluster could significantly improve, and Wirl agreed with this point. It is proposed that the educational institutions should further connect with relevant developments in the logistics sector. This deeper connection has not developed since the majority of firms are mainly focusing on internships and short-term problem-solving.

Koelewijn stated that most firms within the cluster are willing to invest time and money in education and development. This confirms that the educational institution ROC Flevoland does experience that the firms are willing to act proactively over cooperation with educational institutions. Besides internships, all participating parties were unable to name any explicit investments or actions undertaken by the firms. Wirl stated that the logistics sector should be made more attractive. He explained that ASF Fischer ran a pilot four years ago, and since then has not undertaken anything to address this problem.

Uiteindelijk vloeit dan de kennis meer van onderwijs terug naar bedrijven, zo hoort die gewoon, en natuurlijk de praktische kennis zit bij de bedrijven, die helpen dan weer om het theoretisch beter te maken. En dan vloeit het weer terug naar de bedrijven, zodat ze het ook kunnen gebruiken. [Ultimately, the knowledge then flows more from education back to companies, that's the way it should be, and of course the practical knowledge is with the companies, which in turn helps to make things better theoretically. And then it flows back to the companies so they can use it too.] (Frehé, 2022)

In the above quote, de Jonge implies firms should share relevant information, questions and challenges with the educational institutions. Consequently, the educational institutions have to familiarise themselves with these issues and engage with these questions. The knowledge gained could then be shared back to the firms. According to de

Jonge, this would strengthen the connection of the educational institutions since they now possess knowledge and insight on both the theoretical and practical aspects of the logistics sector. Ziermans, for example, stressed the importance of knowledge in both practical and theoretical aspects. Something can look perfect in theory, but not work in practice. He stated that, even within companies, theoretical plans are constructed, but often not realised because they are practically imperfect.

The LCF is an initiative of the municipalities of Almere, Lelystad and Zeewolde. The LCF focuses on the region within the province of Flevoland. De Jonge also stated:

> *De gemeente Zeewolde maakt deel uit van de arbeidsmarktregio Noord-West Veluwe, dus eigenlijk onze notulen ten opzichte van ROC is dan ROC Landstede…. En Lelystad en Almere ook wel een beetje richting Amsterdam gericht. [The municipality of Zeewolde is part of the labour market region of North West Veluwe, so actually our minutes compared to ROC is ROC Landstede…. And Lelystad and Almere also a bit towards Amsterdam.] (Frehé, 2022)*

ROC Landstede is located in Harderwijk and part of the labour market region of Noord-West Veluwe, outside the province of Flevoland. This is also applicable to the ROC of Amsterdam, which is connected to the labour market of Amsterdam, outside the province of Flevoland. A difference occurs when looking at the geographical focus of both Windesheim and ROC Flevoland in general. Windesheim is more actively connected to the province of Flevoland, whereas ROC is a bigger educational institution and spatially spread across the Netherlands. As de Jonge indicated, the municipality of Zeewolde has closer connections with ROC Landstede in Harderwijk, which is not part of the LCF, for example. De Jonge concluded by stating that this makes the cooperation between ROC and the logistics cluster less close. This explains a difference in initial attitude with regards to mutual contact between the educational institutions and the cluster, based on what the two individual educational institutions deliver.

Overall, the majority of parties emphasised that an increase in intensity and quality of mutual contact between the firms and the educational institutions would strengthen the collaboration and, therefore, the connection of educational institutions to the firms in the logistics cluster. The current finding shows that the ongoing mutual contact is holding back the potential of the education-firm collaboration and therefore the connection between the logistics curriculum and logistic work field.

IV.III Theoretical knowledge and student (practical) knowledge

In this part of the results section, an extensive answer to the following sub-questions is formulated: '*How does theoretical knowledge within the educational institutions influence the connection of the logistics curricula to the firm's day-to-day business?'* and *'How does the student knowledge within the educational institutions influence the connection of the logistics curricula to the firm's day-to-day business?*'

During the semi-structured interviews, the input of theoretical knowledge and student practical knowledge and skills were often discussed simultaneously. It often occurred that respondents referred to the theoretical input and student practical input in the same sentence. Therefore, the input of knowledge and practical skills is discussed in the same sub-chapter to maintain a coherent structure.

The current logistics market suffers from high employee shortages. ROC Flevoland is focusing on supplying the physical workforce. Koelewijn explained that ROC Flevoland is trying to be very involved in the labour market and that the educational institution is very willing to supply the market with what is demanded most. Ziermans, sales manager at Westover BV, emphasised that ROC Flevoland is relatively more capable of supplying what is needed in the current market, because they can deliver the workforce that is needed in the warehouses. Ziermans specified that ROC Flevoland can deliver students for practical functions in the warehouses, whereas Windesheim delivers students that have relatively more theoretically inclined functions. Tjeertes, logistics manager at Axflow DC, stated that the firm has close ties with the practical school 'de Steiger' that is not cooperating with the LCF. Most of the internships at Axflow are filled by students from de Steiger. Axflow keeps a close connection with those who are responsible from the practical school of de Steiger.

Martijn Koelewijn, logistics study manager at ROC Flevoland, stated there is contact with the firms to provide more customisation regarding 'Beroepsbegeleidende Leerweg' (BBL). Within a BBL programme, students combine learning and working, which means they go to school one day a week and work four days a week at a firm in the logistics sector (ROC Friese Poort, 2022). The focus on customisation shows a proactive attitude in ongoing contact between the firms in the cluster and ROC Flevoland. Firms show an active attitude with regards to welcoming and retaining students who work most days of the week.

Wim Meiling, logistics manager at Plukon Convenience, strengthened the recent proactive attitude of Windesheim, since he stated they have connected to Windesheim and have contact with them on a regular basis. Meiling explained that Plukon

Convenience has both opportunities for vocational education (MBO) students and higher vocational education (HBO) students and that the connection with ROC Flevoland and Windesheim is different. He said that, for example, Windesheim has closer ties with the business, since this educational institution has certain professors who perform in business too. Taeke Wirl, operational director at ASF Fischer, summarised this point as follows:

> *Bij de MBO gaat het dan voornamelijk over de medewerkers op de werkvloer, dus dat is meer handjes en voetjes. Terwijl bij een Windesheim zal het meer echt op het verwerken van data en dergelijke, en, uhm, zijn. Dus echt wel weer een stapje hoger. [In the MBO, it is mainly about the employees on the work floor, so that means more hands and feet. While at Windesheim, it will be more real about processing data and such, and, uhm. So, it's really a step up.] (Frehé, 2022)*

Taeke Wirl's quote describes how ROC Flevoland and Windesheim differ in their nature and contact with the firms. ROC Flevoland aspires to connect with the labour market and supply students who fit in well regarding practical knowledge, whereas Windesheim aspires to be well substantiated and innovative regarding theoretical knowledge in the logistics cluster. Therefore, the attitude towards the individual educational institutions can differ. This can be traced back to the supply of the physical workforce on the one hand, and the supply of knowledge on the other hand.

So besides the physical workforce and student practical knowledge, there is the supply of theoretical knowledge by the educational institutions. Ziermans stated that the students coming from Windesheim were expected to be skilled at project-based work or the project-managing function. He illustrated by saying he was in contact with a graduated student who led a project. These graduated students came with different insights that focused on less energy usage, fewer emissions and a lower carbon footprint. He emphasised that Westover never thought of these aspects. The current firms mainly focus on running the process, because downtime harms the revenues of a company. Ziermans also said that higher vocational education contributes new knowledge or nuanced views on areas, such as durability and environmental issues. Stolwijk, director of Windesheim Almere, explained that their knowledge centres contain a significant amount of innovative knowledge for the logistics sector. When consulting the knowledge centre at Windesheim, a number of research studies and results on logistics are available. Recently, Windesheim published research on blockchain, supply chain, logistics, big logistics data and infrastructure (Regieorgaan SIA, 2022). To this extent, Windesheim is contributing innovative knowledge to the logistics cluster.

Tjeertes, logistics manager at Axflow DC, mentioned that the connection and contribution with regards to theoretical knowledge of ROC Flevoland was not significant. Axflow DC experienced meaningful knowledge input by Windesheim, since they bring

knowledge at a certain level and are relatively better connected to business in the cluster. Meiling, the logistics manager for Plukon Convenience, did not perceive any significant contribution of knowledge from ROC Flevoland. Firms that have more traditional production processes, such as Axflow DX, Plukon Convenience and ASF Fischer, have a higher demand for practically substantiated students. They are more inclined to connect with ROC Flevoland to receive the physical workforce or internships. Westover BV has a production process that is more focused on automation, robotics and digitisation. They are more inclined to connect with theoretically substantiated students, who are more likely to be found at Windesheim. The type of production process influences the connection to the work field of students who undertake internships, for example.

The potential of a knowledge gap between the educational institutions and the participating firms is briefly outlined in the introduction to this report. ROC Flevoland has tried to overcome this type of knowledge gap through close contact with the firms their BBL students work at four days a week. ROC Flevoland is willing to tailor their programme so that students have knowledge of what they have to do in practice. Wim Meiling, logistics manager at Plukon Convenience, said:

Als je als docent al 10 of 15 jaar les geeft, valt het niet mee om nog de ontwikkelingen in het bedrijfsleven bij te houden. [If you have been teaching for 10 or 15 years as a teacher, it is not easy to keep up with developments in the business world.] (Frehé, 2022)

Meiling explained that overcoming this knowledge gap is a relatively big challenge for ROC Flevoland, since the teachers at the educational institutions have relatively weak direct ties with the firms and cluster. According to Meiling, this caused them to be less aware of what is actually relevant in the logistics sector. He stated that higher vocational education is often too focused on theory, whereas intermediate vocational education is often too focused on traditional practical concepts. He insinuated that this can be solved by improving the direct connection between teachers and business. This could indicate that, for ROC Flevoland, the network sessions should intensify or that a different solution should be thought of.

The direct investments of money and time by Windesheim are discussed above, including the maintenance of the knowledge centre that provides R&D for the logistics cluster. So far, the majority of firms are not experiencing any significant contribution from ROC Flevoland. Martijn Koelewijn, logistics study manager at ROC Flevoland, explained the current investment in a regional investment fund (RIF) subsidy application as follows:

Een subsidie aanvraag waarin we voor meerdere jaren eigenlijk middelen aanvragen om in de logistieke sector extra effort te steken… om er voor zorgen dat er een soort van kruisbestuiving van

kennis ontstaat. [A subsidy application in which we actually request resources for several years to put in extra effort in the logistics sector… to ensure that a kind of cross-pollination of knowledge is created.] (Frehé, 2022)

The RIF subsidy indicates a long-term vision for ROC Flevoland and is an investment to improve their connection with the cluster. It is hoped this investment can increase the connection of ROC Flevoland to the day-to-day business in the logistics cluster. Koelewijn intends that the exchange of theoretical and practical knowledge between the firms in the cluster and the educational institution can have influence on the content of the logistics curriculum and the structure of the curriculum.

Elzakalai, alderman of economic affairs Lelystad, stated that approximately 60% of the input of knowledge in the logistics cluster should come from the educational institutions. De Jonge, economic affairs Zeewolde, emphasised that the theoretical knowledge should mostly flow from the educational institutions to the cluster, but the practical knowledge should flow from the firms in the cluster to the educational institutions. Which, according to de Jonge, should then flow back to the firms in the cluster again. De Jonge stressed that a good input of knowledge by the educational institutions depends on the input of practical knowledge by the firms to the educational institutions. An effective contribution of knowledge by the educational institutions partly depends on the provision of practical knowledge by the firms.

Ik heb ik 2014 mijn logistiek management gedaan, en ik mag er van uitgaan dat sinds 2014 diverse dingen anders gaan in de logistiek die ook aan de leerlingen zijn uitlegt. [I did my logistics management in 2014, and I can assume that several things have changed in logistics since 2014, which have also been explained to the students.] (Frehé, 2022)

Tjeertes stated that Axflow DC expects the educational institutions to contribute to the knowledge in the cluster, since knowledge in the logistics sector is growing every year. Education is focused on this knowledge and is, therefore, expected to eventually transfer it to the firms through their students. Besides the demand for the physical workforce, demand for knowledge is also present. Meiling added that educational institutions can be of great importance to the influx of knowledge regarding energy transition, for example. Ziermans stressed the importance of this influx of knowledge from the educational institutions. He stated that many firms started their production processes years ago, and, as long as these are running, they are not likely to change much. According to Ziermans, new knowledge and visions of less energy usage, lower carbon footprint, lower emissions are, therefore, always implicitly demanded by the firms in the logistics cluster.

Elzakalai, alderman of economic affairs Lelystad, stressed the importance of getting children and students excited in the logistics sector. He claimed there is a vast prejudice with regards to work in logistics:

> *De logistieke sector is niet een vrachtwagen chauffeur die gehaktstaven eet langs de A2, maar dat het verder gaat, tot op heel hoog niveau schakelen op internationaal niveau. [The logistics sector is not a truck driver eating meatloaf along the A2, but that it goes further, switching to a very high level at an international level.] (Frehé, 2022)*

Elzakalai stated the right ingredients to make the logistics sector attractive are not lacking, but there is an absence of the right ambition on the part of both parties. Both the educational institutions and the participating firms in the logistics cluster can be more active in acquiring and tempting new students who could solve the shortages within the sector, which are mainly focused on shortages in the physical workforce. Koelewijn indicated that ROC Flevoland educates approximately 50–100 logistics students each year. He emphasised it is a start, but yet not enough.

The majority of the participating firms stated that they want to connect with education, with the labour market shortage as the main motive. De Jonge emphasised that the investment of time and money in education is not experienced directly, it needs time. He claimed that the firms should open up more to educational institutions to make the cooperation pay off.

Westover BV is the only firm in the sample with a business that focuses on automation and digitisation, whereas the other participating firms carry out a relatively more traditional business. Ziermans stated that Westover BV was interested in acting as a training company and involve students in the day-to-day business of the firm. The firms Plukon Convenience, Axflow DC and ASF Fischer have their major focus on internships with regards to cooperation with educational institutions. The more traditional businesses focus on gaining direct physical workforce, rather than on long-term joint projects. Tjeertes also elaborated that Axflow DC is in close cooperation with the practical school ‘de Steiger’ in Lelystad, since they deliver students who can work in the warehouse for their internships. The difference in attitude between traditional and automation-oriented firms influences the theory connection with educational institutions. Based on the interviews with the participating companies, firms with a stronger focus on automation and digitisation of logistical processes have a slightly higher demand for knowledge, compared to traditional businesses, which have a relatively higher demand for physical workforce.

All participating firms were focusing on the recruitment of employees, rather than on a search for further connection with innovation. This points to the relatively short-term

vision of the majority of firms. In the current market situation, the firms are experiencing a tight labour market for logistics employees. De Jonge, alderman of economic affairs Zeewolde said:

> *Bedrijven zijn vaak bezig met de korte termijn, de jaarrekening moet nu gedekt worden en niet de jaarrekening over 10 jaar … dan ben je te snel operationeel gericht, in plaats van dat je nog eens goed over waar zou ik nou heen willen bewegen. [Companies are often concerned with the short-term, the annual accounts must be covered now and not the annual accounts in 10 years... then you are too quickly operationally focused, instead of having to think about where I would like to move.] (Frehé, 2022)*

He stated that the majority of firms focus on making profit in the short term and focus on the problem of employee shortages in the labour market. The firms only want to cooperate to solve that problem. De Jonge later stressed that the participating firms should shift to a long-term vision, instead of a short-term vision. On the same note, Meiling mentioned that the major emphasis of Plukon Convenience is on recruitment of physical workforce, mainly focusing on the relatively more practically educated student. Westover BV behaves in line with the claim made by de Jonge as well, since they cancelled their membership with the LCF organisation at an early stage. Ziermans explained that Westover BV joined LCF to get into contact with other firms and subsequently acquire more client assignments or orders. This could not occur for them at relatively short notice, so Westover BV cancelled their membership. This reflects a short-term vision present at a relatively more theoretically oriented firm.

Meiling elaborated that Plukon Convenience has just started a plan in which they want to be in contact with logistics students at an early stage by visiting educational institutions and putting up posters. They want to offer students side jobs or part-time jobs in the evening or at the weekends. Plukon Convenience tries to attract students to the firm before they finish their curriculum at the educational institution. This reveals the proactive attitude of Plukon Convenience to the connection with logistics students, however, it shows the emphasis on short-term problem-solving. De Jonge elaborated that he understands the short-term focus of the majority of firms because, due to the shortage of employees in the labour market, the business economics model of most firms is under pressure. De Jonge stated it is a challenge for the firms to adopt a long-term vision for cooperation with educational institutions, however, he claims it is the only solution for the cooperation to pay off. He later said that education and firms should jointly approach relevant issues and problems to improve the cooperation and connection of educational institutions to the cluster.

Overall, the results show that the connection of ROC Flevoland is mainly through the supply of practically skilled students and workers. And Windesheim is mainly focused on the supply of skilled students, but this educational institution is also engaged in R&D and, therefore, a potential contributor to theoretical knowledge for the firms in the logistics cluster. The firms and educational institutions both expect that an increase in input of knowledge and student practical skills and knowledge would have a positive effect on the connection of educational institutions to the firms in the logistics cluster. The positive influence of an increase in input of practical skills is emphasised often by the firms. The firms mainly prioritize the recruitment of physical working force due to the current market shortages. Elzakalai also emphasizes that the current contribution of the schools in the number of students is still far from enough. Investments in the future are also important for stable long-term cooperation. The input of theoretical knowledge is mostly emphasised by the municipalities, rather than by the firms. However, for example, Tjeertjes and Ziermans mentioned the importance and presence of an inflow of new theoretical knowledge. De Jonge however stressed that a meaningful input of new theoretical knowledge by the educational institutions is dependent on the input of practical knowledge by the firms.

IV.IV Role of the Logistics Cluster Flevoland

In this part of the results section, an extensive answer to the following sub-question is formulated: '*How does the adopted approach of the LCF organisation influence the educational institutions' connection with the firm's day-to-day business?'*

The LCF organisation emphasises that they work on promoting logistics expertise, providing education, providing training and providing courses (Mathot, 2020). It is therefore expected that the effort made by the LCF improves the connection between education and the cluster. All participating firms were asked if they noticed any difference between the connection with education between four years ago and now. They all answered 'no' right away. The connections that were present four years ago remain unchanged. Regarding the connection between education and the cluster, Ziermans, sales manager at Westover BV, said:

Logistiek Cluster Flevoland heeft geprobeerd om bedrijven en de scholen wel samen te brengen bij bijeenkomsten, maar dan lopen daar zo'n 40 bedrijven en probeer dan maar eens de juiste personen te spreken met wie je graag aan tafel wilt, want dan staan er nog 39 andere bedrijven die dat ook graag willen. En dat maakt het vaak lastiger in dat soort bijeenkomsten. [Logistics Cluster Flevoland has tried to bring companies and schools together at meetings, but then there are about 40 companies there and then trying to speak to the right people with whom you would like to sit at

the table, because then there are still 39 other companies that would also like to talk. And that often makes it more difficult in those kinds of meetings.] (Frehé, 2022)

This explains that a proactive attitude by the firms is present, since many of them show up at organised meetings. However, these meetings are not as fruitful as hoped for. Meiling pointed out the same challenge and stated that a speed dating concept could potentially be more fruitful. He expects that speed dating would make it possible to speak with many parties and increase personal connection. Meiling stated that, in the near future, it would then be easier to contact each other and connect with the right person for the right issue, for example.

The municipalities have the same ideas and expectations of the LCF organisation. Elzakalai emphasises the LCF should act as an intermediary in bringing all the parties of interest together. However, according to Elzakalai, 1-on-1 contact between educational institutions and firms, without the organisation mediating, is preferred. De Jonge also stated that the municipalities, as one of the initiators, can only facilitate. According to de Jonge, the municipalities have the capabilities to bring parties together and stimulate or facilitate them, however, the rest of the collaboration between the educational institutions and firms should be taken care of by themselves.

The expectations and experiences of the educational institutions concur with the ideas of the municipalities since Koelewijn states the following regarding the role of the LCF:

Dus het is vooral de netwerkfunctie die de meerwaarde eigenlijk is voor ons nu, de faciliterende netwerkfunctie voor ons als onderwijsinstelling … het is een platform waar wein de toekomst van hopen dat het voor ons makkelijk is om daar het netwerk met bedrijven te raadplegen. [So, it is mainly the network function that is the added value for us now, the facilitating network function for us as an educational institution … it is a platform that we hope in the future will make it easy for us to consult the network of companies.] (Frehé, 2022)

In the above quote, Koelewijn states ROC Flevoland hopes that the LCF organisation facilitates a network in the future. This emphasises the current absence of such a network. Relating to this observation regarding the role of the LCF, Meiling said:

Als het LCF er niet was geweest, dan had Plukon Convenience nog steeds evenveel contact gehad met de scholen. Het LCF heeft daar niet in bijgedragen. [If it had not been for the LCF, Plukon Convenience would still have had just as much contact with the schools. The LCF did not contribute to this.] (Frehé, 2022)

Other answers by the participating firms are in line with Meiling's answer above. This shows the relatively low effect the LCF organisation has had for contact and

collaboration between the educational institutions. Little influence of the LCF organisation on the contact and connection between the educational institutions and the firms could be applicable if the contact and connection between the educational institutions and the firms is proceeding perfectly and as desired. The results show this is not the case since the firms indicate the necessary wishes and points for improvement that are stated earlier on in the results section. It can be observed that the firms do not know what the exact role of the LCF is and the organisation is still in its initial phase. The LCF has created an online platform where members can connect. The participating firms stated they do not connect with the educational institutions on this platform. Meiling also explained that the platform is not fully developed yet and is still a little vague for him. Ziermans stated that Westover BV has not undertaken any specific action to come into contact with the educational institutions. He underpinned his statement with the following remark:

Je wil ook niet als bedrijf zeggen van uhm ik stap rechtstreeks zelf op een bedrijf af, omdat je in een cluster zit, je wilt dat cluster ook weer niet voorbij lopen. [You don't want to say as a company either, uhm I'll go directly to a company myself, because you're in a cluster, you don't want to walk past that cluster either.] (Frehé, 2022)

This shows Ziermans expects the organisation of LCF to take on the role of a proactive 'connector', and that Westover BV does not want to play past the LCF organisation. To some extent, this is in line with the vision of the municipalities, however, it does indicate that this role of the LCF organisation is not sufficiently experienced by the firms in the logistics cluster.

On the one hand, this uncovers a wait-and-see attitude from the firms. On the other hand, it shows an uncertainty in the initial phase of the LCF organisation with regards to its role. Stolwijk, director of Windesheim, stated that the direct contact between the firms and Windesheim did not get off the ground sufficiently. Tjeertjes also explained that Axflow DC assumes the organisation of LCF and the platform are working on optimising the system. This could explain the more reserved attitude of the firm(s). Many interviews showed that there is a mismatch between the view of the role of the LCF organisation between the initiators and the participants. Clear communication on the role of the LCF and the structure of the organisation could potentially alter the attitude and actions of participating firms.

Regarding the approach of the LCF organisation, the parties of interest expect that an increase in facilitation by the LCF organisation would positively influence the connection of logistics curricula at the educational institutions to the firms in the LCF. Overall, the results show that the municipal parties emphasise they can only act as

facilitators and the firms are responsible for the rest of the collaboration. All the participating firms indicated there had been no impact on collaboration with the educational institutions since the formation of the LCF organisation. The findings show that the current adopted approach of the LCF organisation does not (positively) influence the connection with and contribution from the educational institutions.

V. Discussion

Logistics curriculum

Regarding the quantitative analysis of the logistics curriculum and their link to the logistics work field, some differences exist between ROC Flevoland and Windesheim. On average, Windesheim performs sufficiently regarding the variables of interest, since the influence of guest lectures, internships, student projects, regular curriculum content and R&D score higher than 'not agree, nor disagree'. This indicates that the students at the educational institution of Windesheim perceive their curriculum as connecting relatively well with the logistics work field regarding the given variables. These findings are in line with the existing literature from Tochacek et al. (2016), Amorim et al. (2012) and Cunningham & Link (2015) who have stated that student projects, internships and R&D significantly affect the quality of educational programmes and the link with the practice of work. The above findings are also in line with the results from Krstic and Damnjanovic (2016), who find that the harmonisation of the curricula content to the market improves cooperation and the connection of educational institutions with the firms. The research does not include a baseline measurement, which makes it hard to compare to what extent the variables of interest have increased the connection with the logistics day-to-day business.

On average, ROC Flevoland scores relatively lower, but still above the threshold value of 3.0, for the variables of internships, student projects and curriculum content. ROC Flevoland scores below the threshold value of 3 for the variables of guest lectures and R&D. The possible presence of different scores between two educational institutions that focus on different levels of education is emphasised by Motashi (2004). This difference can be explained by the fact that ROC Flevoland does not explicitly perform R&D. The number of guest lectures at ROC Flevoland is lower, compared to Windesheim. This difference is also emphasised by Basant and Chandra (2007) where they have asserted there is a clear hierarchy regarding connection and contribution between educational institutions that solely undertake teaching and those that also perform research. This phenomenon was also emphasised in the qualitative part of the research. Meiling argued that higher vocational education is more likely to have teachers and professors in their institute that are also active in the business sector, whereas intermediate vocational education is more likely to have teachers who are solely focused on teaching and have limited connection with the logistics work field. Many studies, such as Riebe et al. (2013), Metrejean et al. (2010) and Omrod (2006) have described how this distinction plays an important role in exposing students to the real work field. A comparatively low number of guest lectures causes the perception of students regarding the influence of guest lectures

on their link to the logistics work field as low. This is proven by the difference in average scores between ROC Flevoland and Windesheim.

Results show that, on average, internships have the strongest influence on students' perception of the connection with the logistics work field. The concept of internship is distinguished in the gain of theoretical knowledge and the development of practical skills. On average, it is found that the development of practical skills most strongly influences the students' perception of the link to the logistics work field. This concurs with the findings of Bir and Yadav (2021), where they have highlighted educators need to pay attention to the requirements in the work field. As stated before, the current logistics work field has a high demand for practically skilled students and workers, and the practical aspect of internships responds to this demand.

Overall, the results show that, on average, all students within the sample strongly disagree or disagree with the statement that mentions their educational institution prepares and connects them well for the logistics labour market. This shows that even though multiple variables of interest increase the link of the curriculum with the work field, overall preparation for the labour market is still perceived as insufficient. Eldon et al. (2008) have emphasised that a poor fit between the industry demand and an education's total curriculum hinders the connection and contribution of educational institutions to the industry. Based on the results of Eldon et al. (2008), the connections in the LCF should be further improved for more fruitful results.

Mutual contact

Regarding the mutual contact between firms and educational institutions, it is found that the educational institutions adopt a proactive attitude and want to connect and increase mutual contact. Windesheim and ROC Flevoland are usually present at organised meetings and new projects. They openly express themselves, stating they want to connect and contribute to the logistics work field. Initially, the educational institutions organised knowledge sessions. Their first initiative was active, but, afterwards, a lower intensity of mutual contact was experienced. The low intensity of meetings and mutual contact was emphasised by Wirl, Ziermans and Meiling, however, it can be argued that the Covid-19 pandemic caused the number of physical meetings to be relatively low. Both firms and educational institutions stated they preferred physical contact over digital contact to really get to know each other and connect. Most firms have had contact with educational institutions regarding internships but, according to Wirl, further contact has been left out.

Meyer (2006) has also found firms that are part of a cluster organisation do not approach educational institutions with any appreciable distinctiveness. According to Meyer (2006), firms tend to mainly pursue mutual contact through secure in-house ‘people’ resources, such as internships, rather than highly structured faculty contacts. The research results show that this, for the most part, is still applicable regarding the initiatives of firms in mutual contact with the educational institutions. The participating logistics firms tended to state they adopted an active attitude regarding mutual contact. However, the firms are not able to list explicit examples of this attitude, except for internship contact in some cases. This observation concurs with the results of Changhee and Won (2019), who have stated that logistics firms do not seriously consider educational institutions as crucial sources of theoretical or practical knowledge. This assessment sits alongside the demand from the firms for practically skilled students and workers as additional workers in the warehouses.

The results show that the participating firms in the LCF mainly focus on the acquisition of their labour force, whereas the demand in the current logistics market is high for warehouse employees. Mutual contact with ROC Flevoland is higher for the traditional firms. Automation-oriented firms have a higher tendency towards mutual contact with Windesheim, since Windesheim educates students that fit the demand in these types of firms. Stolwijk, director of Windesheim, also emphasised that mutual contact is insufficient. According to Stolwijk, this is mainly because contact went via a project manager. Vesperi et al. (2021) have shown that the degree of intensity of collaboration is relevant for the transfer of new knowledge. Both the influence of theoretical and student (practical) knowledge transfer is expected to be limited due to low contact intensity between firms and educational institutions.

The results show that firms’ major focus is on short-term problem-solving and acquiring as many warehouse and production employees as possible. Educational institutions focus on relatively long-term cooperation, since they want the long-term connection and contribution and transfer of physical and theoretical knowledge to be created and maintained. In the short term, educational institutions can only educate a certain number of students. This highlights a different approach in mutual contact between educational institutions and firms.

Firms want to mainly approach ROC Flevoland for the provision of a physical workforce, whereas most firms also state that Windesheim has closer ties with the business sector. This closer tie is caused by the fact that professors in higher vocational education are more likely to be working in the business sector. This factor is less common

for teachers in intermediate vocational education. Both firms and educational institutions stated mutual contact should increase significantly. Throughout the interviews, it is mentioned many times that practice and theory should meet more often in order to allow educational institutions to contribute more to the logistics work field. Relatively more contact is expected to result in delivery of more complete and fitting graduates and theoretical knowledge to the logistics work field. Krstic and Damnjanovic (2016) have emphasised the importance of mutual contact and harmonisation of the curriculum and practical training for students. This can only take place when firms show increased mutual contact and provide practical training and activities to achieve a shift for firms from their short-term focus to a longer-term focus to tackle the labour market shortages.

Influence of theoretical knowledge

Regarding the flow of knowledge from the educational institutions, it is observed that Windesheim contributes more, compared to ROC Flevoland. Windesheim, for example, also provides a curriculum on logistics data processing, whereas ROC Flevoland provides more practically oriented curriculum, such as transport driver and logistics employee. Firms also emphasise that higher vocational education, such as Windesheim, supplies new knowledge and nuanced ideas. Windesheim is theoretically active through their knowledge centre. This centre recently published many studies on logistics-related topics, such as supply chain management, logistics data management and infrastructure, for example. Through these publications, Windesheim contributes to the knowledge that is present in the LCF. Moon et al. (2019) have found that these types of activities by higher educational institutions affect the innovation performance of firms. This finding underpins the connection of Windesheim, through the knowledge centre, since their research studies can support product and process innovation (Moon et al., 2019).

Axflow DC emphasised that the theoretical connection and contribution of ROC Flevoland is not of any significance. Westover BV expected theory-oriented students to be delivered mostly from higher educational institutions like Windesheim. So far, the participating firms do not experience any theoretical input by ROC Flevoland, and only by Windesheim through internships and the knowledge centre. However, Koelewijn stated that ROC Flevoland is working on a RIF subsidy. This subsidy is provided by the government and can be used to strengthen the contact between ROC Flevoland and the firms to improve the connection of ROC Flevoland to the logistics sector in Flevoland, through the input of both practical and theoretical knowledge. Bir and Yadav (2021) and Wu et al. (2013) have highlighted the need for educators to pay attention to the widening

gap between their course content and the skills required in the industry. The investments in a RIF subsidy point out the awareness and willingness to improve the curriculum by ROC Flevoland regarding this possible gap. Limiting, or blurring, the gap between logistics curricula and industry needs is expected to improve the educational institutions' connection to the day-to-day business in logistics firms.

According to the firms, they lack knowledge of sustainability and durability. The main reason for this is the firms' focus on constantly keeping their production process running and their emphasis on generating revenue. However, Liu and Zeinaly (2020) have shown that an open attitude toward knowledge sharing affects a firm's innovation. A maximum level of knowledge transfer can increase innovation, efficiency and, therefore, revenue for a firm. In other words, educational institutions are relatively up-to-date on topics, such as sustainability and durability, but the firms need to adopt an open attitude toward knowledge sharing for a significant connection and contribution by the educational institutions to be made.

Influence of student (practical) knowledge

Regarding the flow of student (practical) knowledge by the educational institutions, the firms' main focus is on ROC Flevoland. ROC Flevoland stated they want to adapt to demand in the labour market by focusing on the supply of practically skilled graduated. Each academic year, ROC Flevoland has the capacity for approximately 50–100 logistics curriculum graduates. The participating firms state that ROC Flevoland is relatively more capable of supplying the type of student that is currently needed, such as warehouse employees. These types of students and graduates are preferred over process managers who are more likely to be educated by Windesheim, for example. The type of curriculum at ROC Flevoland connects better to current labour market demand, since they are more practically focused. Karlsen and Lund (2019) have found that the working sector relies heavily on knowledgeable practitioners to remain competitive in the market. Axflow DC is collaborating with de Steiger, a practical school in Lelystad, that only supplies practically skilled graduates and interns who work in warehouses on the machines, for example. ROC Flevoland also provides BBL students. These are students who work four days per week and go to school one day per week. ROC Flevoland is willing to customise the curriculum in such a way that their connection to the firms' demand is highest. This activity is in line with results from Eldon et al. (2008) and Bir and Yadav (2021), who have shown that making enhancements in the curricula regarding the industry needs can improve the contribution and connection of an educational institution with the day-to-day business in firms. According to Olazaran et al. (2018), firms should strengthen their relationship with

vocational education to obtain the advantages of human resources and practically skilled workers. ROC Flevoland contributes relatively more practically skilled workers compared to Windesheim. In line with this observation, firms have the tendency to connect more with ROC Flevoland to solve the short-term labour market shortages regarding this type of worker.

Adopted approach of the LCF organisation

Regarding the adopted approach of the LCF organisation, the experiences and ideas are varied. On the one hand, educational institutions describe the organisation as important for a network function in the future. On the other hand, firms are not really informed on the role and adopted approach of the LCF organisation. All participating firms indicate they have not noticed any influence from the LCF organisation. In the first year of the LCF, there was a meeting, but this meeting was not as fruitful as hoped. Many firms were present, which caused it to be difficult for each firm to connect and speak to relevant parties. All firms interviewed stated they do not experience any difference in connection and contribution with regards to the educational institutions since the LCF organisation was set up.

The municipalities stated that the LCF organisation aims to facilitate cooperation between educational institutions and firms in the logistics sector. The participating firms stated that, in practice, they do not experience the LCF organisation to be undertaking this facilitation. The firms emphasised that this is probably due to the LCF organisation still being in an initial phase. Further development of a cluster network is expected to best take place during face-to-face contact between the parties of interest. At the time of this research, society had been free of any Covid-19-related regulations for approximately two months, therefore, it is expected that further developments can arise in the future, when face-to-face contact is more possible. Until then, firms showed they have the tendency to adopt a wait-and-see attitude towards the LCF organisation and its contribution to the education-firm collaboration. Moon et al. (2019) have found that the absorptive capacity of firms plays a moderating role in cooperation with educational institutions. This could imply that shifting away from the wait-and-see attitude can potentially enhance the influence of the LCF organisation in the education-firm connection and collaboration.

VI. Conclusion

VI.I Summary

The main research question answered in this study is: *How do the logistics curricula at the University of Applied Sciences Windesheim and ROC Flevoland connect with the day-to-day business of firms in the LCF?* An answer to this question can provide insight into the alleged collaboration between educational institutions and firms and show whether this collaboration is significant.

The research design used a mixed-methods approach. The quantitative part of the research focused on the influence of the variables of guest lectures, internships, students project, curriculum and R&D on the connection between the logistics curriculum and the educational institution's connection with the day-to-day business in logistics firms. For this analysis, a survey was conducted amongst students of logistics-related studies at ROC Flevoland and Windesheim. Semi-structured interviews were conducted with participating parties in the LCF cooperation, including municipalities, educational institutions and firms within the cluster. The interviews provided insight into the role of the LCF organisation, mutual contact between the educational institutions and the firms, and the input of theoretical and practical knowledge. The quantitative data was analysed using descriptive statistics. The qualitative data was analysed using inductive and deductive coding.

The results show that the connection between the logistics curricula at the educational institutions Windesheim and ROC Flevoland is relatively limited. ROC Flevoland mainly contributes with the provision of practically skilled students and graduates who can work or perform internships in the warehouses and related traditional processes, such as truck driver. Theoretical input in the connection and contribution of ROC Flevoland is fairly low. The University of Applied Sciences Windesheim contributes to the cluster by also providing theoretically skilled students and graduates who can work or perform internships in, for example, logistics management, supply chain management and data management. Windesheim also contributes through their knowledge centre, which has published research on logistics-related content. This contributes to the knowledge, development and innovation within firms in the logistics cluster.

The influence of the concepts mutual contact and role of the LCF organisation are also explored. It is found that regarding mutual contact both the educational institutions and firms assess their attitudes as proactive. Firms focus on contact for short-term problem-solving, such as the acquisition of warehouse workers. On the contrary, educational institutions focus on contact for long-term goals, such as strengthening the link of the curricula to practice and teaching at the firms. This causes low efficiency and

effectiveness of mutual contact. The LCF organisation intends to adopt a facilitating role in the contact between firms and educational institutions. On the one hand Windesheim and ROC Flevoland emphasize the importance of the LCF organisation, on the other hand the participating firms do not experience any input or facilitation by the LCF organisation.

Both the educational institutions and firms in the LCF state that the connection and cooperation can be improved significantly. This can be realised through increasing coordination and closer contact between the parties. Both parties expect this can increase the connection and contribution of schools in both theory- and practice-related knowledge. Coordination and more intensive contact can ensure that both parties are more on the same page and create more concrete agreements together, since a mismatch is present in terms of vision. Schools are currently adopting a more long-term vision, while companies are stuck with a short-term vision.

VI.II Limitations of the research

The research has some limitations. First, the cluster analysed is relatively young. The cooperation of the government, educational institutions and the firms within the cluster started in 2020. The LCF has existed for approximately two and half years. Some processes or developments have not yet been fully recorded or experienced by the participating parties. This may have influenced answers in the survey or in the interviews.

Second, the number of educational institutions that were observed was limited to ROC Flevoland and Windesheim since they were in partnership with the LCF. More educational institutions may be contributing to the cluster from outside the region since, on a national scale, there are other educational institutions and curricula focusing on logistics.

Third, the time constraint of the research is a limitation. The research was performed in approximately a two-month time frame. This influenced the possibilities with regards to conducting the survey and interviews. The response to the survey was relatively limited. The time constraint also affected the willingness to cooperate at the educational institutions and influenced the survey and interview possibilities. The survey had to be conducted via an online survey that was distributed on the educational institutions' online platforms. Future research could incorporate more educational institutions, more students and more participating enterprises to generate higher validity for the research results. This research considered only two educational institutions and only some logistics courses in those educational institutions. The conclusions drawn here cannot be extrapolated to other courses that were not included in the research.

Fourth, at the time of the research, Covid-19 regulations had only just been removed. The LCF has existed within a Covid-19 regulated society for most of its existence. The potential influence of these regulations on the cooperation between educational institutions and firms and the data collection has to be considered.

Fifth, the positionality of the author may have influenced the study. A bias could arise regarding bachelor study in the Geography, Planning and Environment Department at Radboud University, which is a different school and focused on different topics from the two schools studied in this research. The point of view the author may differ from those of the students at ROC Flevoland and Windesheim, since these educational institutions provide different curricula on different levels. This is taken into account when analysing the data from the survey.

Lastly, the research is focusing on the connection and contribution of educational institutions in the logistics work field. No ethical dilemmas were present.

VI.III Recommendations for praxis and future research

Both the educational institutions and firms in the LCF state that the cooperation can make an improvement. Coordination and more intensive contact can ensure that both parties are more on the same page and create more concrete agreements together, since a mismatch is still present in terms of visions and goals. So, both the firms and educational institutions should actively commit to higher intensity and quality of contact. Mutual contact should not solely focus on showing the outside world that the given parties are working together, but should focus more on high quality and long term contact to get the most out of the education-firm collaboration.

Fruitful contact between the educational institutions and firms should focus on face-to-face contact, and both parties stated they preferred this type of contact. Logistics firm representatives stated that the collective meetings that have been organised so far are not as effective and efficient as hoped. According to the firm representatives, mutual contact and meetings should focus on 1-on-1 contact, which could create better bonds and mutual insights. Meiling, for example, suggested a speed dating concept to increase personal connection, instead of a meeting with 40 firms at the same time. Educational institutions are adopting a more long-term vision, while companies are stuck with a short-term vision. The municipality representatives mentioned that the intrinsic motivation of firms should shift away from a short-term vision to create a more fruitful collaboration and better connection of education to practice. The municipalities of Zeewolde, Almere and Lelystad should brainstorm on how their facilitating role can influence a shift in vision of the firms.

Based on the recommendations for praxis described above, future research is able to play a role. First, future research could replicate the study to some extent, but use a higher number of respondents for both the survey and interviews. Future research could explore the connection of logistics education to the logistics work field in, for example, a 50-kilometre range rather than limiting the educational institutions selected to the province of Flevoland. Including more firms could increase the validity and reliability of the research. It is recommended that firms are interviewed until a saturation point is reached. Second, future research could focus on the most efficient and effective type of mutual contact between the logistics firms and logistics education. All participants stated that mutual contact has not changed over the last years and can be significantly increased. Lastly, future research could examine how the short-term vision of logistics firms can be influenced. The short-term vision could be shifted to a more long-term vision through, for example, programming, policy and subsidy.

It is shown that if there is any contact between a firm and an educational institution, that it often focusses on internships. Regarding the connection and between logistics curricula and the logistic work field both the qualitative and quantitative data show that there is more progress to be achieved. So, changing attitudes and visions of educational institutions, firms and also municipalities can play a major role in achieving stronger and higher quality connection of the logistic curricula to the logistic day-to-day business in LCF.

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Appendices

I Survey of educational institutions

1. Ik identificeer mij als: *

   Markeer slechts één ovaal.

   - ◯ Man
   - ◯ Vrouw
   - ◯ Zeg ik liever niet

2. Ik zit op deze onderwijsinstelling: *

   Markeer slechts één ovaal.

   - ◯ Hogeschool Windesheim
   - ◯ ROC Flevoland
   - ◯ Anders: _____

3. In welk leerjaar zit jij? *

   Markeer slechts één ovaal.

   - ◯ Leerjaar 1
   - ◯ Leerjaar 2
   - ◯ Leerjaar 3
   - ◯ Leerjaar 4

4. Ik volg op dit moment deze studie

Markeer slechts één ovaal.

- ◯ Logistics Engineering
- ◯ Logistics Management
- ◯ Logistiek
- ◯ Ruimtelijke Ontwikkeling - Mobiliteit
- ◯ Technische Bedrijfskunde
- ◯ Chauffeur Goederenvervoer
- ◯ Logistiek Medewerker
- ◯ Logistiek Supervisor
- ◯ Logistiek Teamleider
- ◯ Anders: _____

5. Ik vind dat ik tijdens mijn huidige studie voldoende projecten of opdrachten doe, die te maken hebben met werk in de logistieke sector. *

Markeer slechts één ovaal.

- ◯ Helemaal oneens
- ◯ Oneens
- ◯ Neutraal
- ◯ Eens
- ◯ Helemaal eens

6. Hoeveel projecten of opdrachten heb jij gedaan die te maken hebben met werk in de logistieke sector? *

Markeer slechts één ovaal.

- 0
- 1
- 2
- 3
- 4
- 5 of meer

7. Ik vind dat ik projecten of opdrachten die met de logistieke sector te maken hebben mij veel bij leren over werken in de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

8. Ik vind dat projecten die met de logistieke sector te maken hebben mij goed voorbereiden om een echte bijdrage te leveren aan de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

9. Ik vind dat docenten tijdens de colleges/les veel praktijkvoorbeeld laten zien en toelichten *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

10. Ik vind dat onderzoek dat is gedaan door mijn eigen onderwijsinstelling over de logistieke sector ervoor zorgt dat ik meer leer over het werk in de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

11. Ik vind dat tijdens de colleges/les het regelmatig gaat dat onderwerpen die belangrijk zijn voor de logistieke sector genoeg worden behandeld. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

12. Ik vind dat de inhoud van mijn huidige studie te weinig aandacht geeft aan onderwerpen die belangrijk zijn voor de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

13. Ik zou tijdens de colleges/lessen graag nog meer te weten komen over de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

14. Ik vind dat mijn huidige studie over voldoende logistiek gerelateerde programma's en/of software beschikt , waar ik zonder mijn opleiding geen toegang tot zou hebben. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

15. Ik vind dat mijn huidige studie mij voldoende mogelijkheden biedt om met programma's en specifieke software te werken, die later tijdens mijn werk handig/belangrijk zijn. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

16. Ik vind dat mijn huidige studie voldoende trainingen / workshops bevat die gaan over het werk in de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

17. Ik vind dat mijn huidige studie voldoende gast colleges bevat, gegeven door mensen die werken in de logistieke sector. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

18. Ik heb een stage in de logistieke sector gevolgd (of wil gaan volgen) *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens
- Niet van toepassing

19. Ik vind dat ik tijdens mijn stage veel heb geleerd over hoe dingen in de praktijk moeten (of ik verwacht dat ik tijdens mijn stage veel dingen leer over het in de praktijk moet) *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens
- Niet van toepassing

20. Ik vind dat ik op mijn stage veel heb geleerd over de theorie achter de praktijk, dus waarom dingen op een bepaalde manier moeten (of ik verwacht veel te leren over waarom dingen op een bepaalde manier moeten). *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens
- Niet van toepassing

21. Ik vind dat er tijdens mijn colleges/lessen voldoende is verteld over wat Logistiek Cluster Flevoland is en doet.

Markeer slechts één ovaal.

- ◯ Helemaal eens
- ◯ Eens
- ◯ Neutraal
- ◯ Oneens
- ◯ Helemaal oneens

22. Ik heb ooit iemand gesproken die werkt in Logistiek Cluster Flevoland

Markeer slechts één ovaal.

- ◯ Ja
- ◯ Nee
- ◯ Weet ik niet

23. Ik ben ooit bij een bedrijf geweest dat onderdeel is van Logistiek Cluster Flevoland

Markeer slechts één ovaal.

- ◯ Ja
- ◯ Nee
- ◯ Misschien

24. Ik merk dat er een goede samenwerking is tussen mijn school en Logistiek Cluster Flevoland. *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

25. Indien 'eens' of 'helemaal mee eens', deze goede samenwerkingen merk ik aan:

26. Ik vind dat mijn huidige studie de juiste dingen bevat en behandeld, waardoor ik mij goed voorbereid voel op werken in de logistieke sector *

Markeer slechts één ovaal.

- Helemaal oneens
- Oneens
- Neutraal
- Eens
- Helemaal eens

27. Indien ‘eens’ of ‘helemaal mee eens’, een voorbeeld van iets wat mijn huidige studie beter kan doen:

28. Ik denk/hoop na mijn studie te werken bij een bedrijf binnen Logistiek Cluster Flevoland.

Markeer slechts één ovaal.

- Ja
- Nee
- Misschien

29. Heb je misschien nog wat toe te voegen met betrekking op jouw huidige studie en/of het logistieke cluster in Flevoland?

II Interview guide for firms

Introduction:

1. Zou u zichzelf voor kunnen stellen?
2. Wat is uw functie binnen dit bedrijf?

In dit onderzoek ben ik geïnteresseerd in de connectie en samenwerking tussen de logistieke bedrijvigheid binnen Logistiek Cluster Flevoland en de onderwijsinstellingen die officieel samenwerken met Logistiek Cluster Flevoland.

3. Wat vindt u van deze samenwerking?

Internships:

4. Hoe denkt u over stageplekken?
    a. Waarom?
5. Heeft u de afgelopen jaren stageplekken vergeven aan studenten van Hogeschool Windesheim en/of ROC Flevoland?
    a. Had u meer/minder stageplekken willen vergeven?
    b. Waarom?
6. Hoe ervaart u de kennis en kunde van studenten aan wie u een stageplek heeft vergeven?
7. Heeft u daar een voorbeeld bij?
8. Zorgen studenten met een stageplek voor nieuwe kennis of technieken o.i.d. die voorheen nog niet bekend of onvoldoende bekend waren binnen uw bedrijf?
    a. Voorbeeld?
9. Ziet u studenten die stage hebben gelopen bij uw bedrijf terugkeren in de logistieke sector / Logistiek Cluster Flevoland?
    a. Waarom wel/niet?

Theoretical and student knowledge:

10. Wat zijn de voornaamste doelen van deze samenwerking?
11. Op welke manier wordt van de scholen verwacht dat zij kennis vergaren over het logistieke cluster?
    a. Of wordt er überhaupt verwacht dat de scholen specifiek kennis vergaren over het logistiek cluster?
12. Wat wordt er binnen de samenwerking van de bedrijvigheid van de participerende bedrijven verwacht?
    a. Zijn er richtlijnen/afspraken/beleidsdocumenten etc.?
13. Wat wordt er binnen de samenwerking van de participerende onderwijsinstellingen verwacht?
    a. Zijn er richtlijnen/afspraken/beleidsdocumenten etc.?
14. Vindt u dat de creatie en verspreiding van nieuwe (relevante) kennis in het logistiek cluster voornamelijk bij de onderwijsinstellingen ligt?
    a. Waarom wel/niet?
15. Denkt u dat de scholen een significant bijdrage leveren aan de institutionele kennis in het logistiek cluster?
    a. Waarom wel/niet?

Mutual contact:

16. Is er direct contact tussen uw bedrijf en de organisatie van Logistiek Cluster Flevoland?
    a. Hoe verloopt dit?
17. Is er via een tussenpartij contact tussen uw bedrijf en de organisatie van Logistiek Cluster Flevoland?
    a. Hoe verloopt dit?
18. Is er direct onderling contact tussen uw bedrijf en Hogeschool Windesheim Almere en/of ROC Flevoland?
    a. Voorbeeld?
19. Is er via een tussenpartij onderling contact tussen uw bedrijf en Hogeschool Windesheim Almere en/of ROC Flevoland?
    a. Voorbeeld?
20. Zijn er nieuwe vormen van contact ontstaan over de laatste jaren?
    a. Voorbeeld?
21. Is er contact tussen de bedrijven onderling over dergelijke onderwerpen?
    a. Voorbeeld?

Theoretical knowledge:

Een academische spin-off is een onderneming waarvan de activiteiten, producten en/of diensten zijn gebaseerd op knowhow, technologie en/of onderzoeksresultaten gegenereerd aan de Hogeschool Windesheim of ROC Flevoland (Universiteit Antwerpen, 2021).

22. Kent u een academische spin-off binnen Logistiek Cluster Flevoland?
    a. Kunt u daar wat meer over vertellen?
23. Is dit iets waar u als bedrijf interesse in heeft of open voor staat?
    a. Waarom wel, waarom niet?

Attitude logistic firms:

24. Vindt u dat uw bedrijf een open houding aanneemt richting de onderwijsinstellingen?
    a. Indien ja, waarom wel?
    b. Indien nee, waarom niet?
25. Is de samenwerking van onderwijsinstellingen binnen LCF belangrijk voor uw bedrijf?
    a. Wat vindt u de toegevoegde waarde?
    b. Waarom niet?
26. Heeft u bedrijf specifieke dingen ondernomen om studenten van de samenwerkende onderwijsinstellingen aan te trekken?
    a. Voorbeeld / uitleg?

Adopted approach LCF organisation:

Officieel bestaat Logistiek Cluster Flevoland nu ongeveer 2 jaar (opgericht in 2020).

27. Merkt u verschil in de samenwerking / connectie met de onderwijsinstellingen vergeleken met de periode voorafgaand de officiële oprichting van LCF?
    a. Kunt u daar een voorbeeld bij geven?
    b. Corona impact? Online meetings o.i.d. etc.

Ik wil u hartelijk danken voor uw deelname aan dit interview. Tevens wil ik nog eens benadrukken dat uw anonimiteit voorop staat. Ik zal het transcript van dit interview (met een pseudoniem) met u delen als u dat wilt? Vindt u het goed dat ik u eventueel nog een keer contacteer indien ik bij het analyseren van het interview nog op een vraag stuit? Heeft u misschien nog vragen of opmerkingen?

Interview guide English

Introduction:

1. Could you introduce yourself?

2. What is your position within this company?

In this research I am interested in the connection and cooperation between the logistics activities within Logistics Cluster Flevoland and the educational institutions that officially cooperate with Logistics Cluster Flevoland.

3. What do you think of this collaboration?

Internships:

4. What do you think about internships?

    a. Why?

5. Have you given internships to students of Windesheim University of Applied Sciences and/or ROC Flevoland in recent years?

    a. Would you have liked to offer more/fewer internships?

    b. Why?

6. How do you experience the knowledge and skills of students to whom you have given an internship?

7. Do you have an example for that?

8. Do students with an internship provide new knowledge or techniques or the like that were previously unknown or insufficiently known within your company?

    a. Example?

9. Do you see students who have completed an internship at your company returning to the logistics sector / Logistics Cluster Flevoland?

    a. Why/why not?

Theoretical and student knowledge:

10. What are the main goals of this collaboration?

11. In what way are schools expected to acquire knowledge about the logistics cluster?

    a. Or are schools expected to acquire specific knowledge about the logistics cluster at all?

12. What is expected within the cooperation of the activity of the participating companies?

a. Are there guidelines/agreements/policy documents etc.?

13. What is expected of the participating educational institutions within the collaboration?

a. Are there guidelines/agreements/policy documents etc.?

14. Do you think that the creation and dissemination of new (relevant) knowledge in the logistics cluster mainly lies with the educational institutions?

a. Why/why not?

15. Do you think that the schools make a significant contribution to the institutional knowledge in the logistics cluster?

a. Why/why not?

Mutual contact:

16. Is there direct contact between your company and the Logistics Cluster Flevoland organisation?

a. How does this work?

17. Is there contact between your company and the Logistics Cluster Flevoland organization through an intermediary?

a. How does this work?

18. Is there direct mutual contact between your company and Windesheim University of Applied Sciences Almere and/or ROC Flevoland?

a. Example?

19. Is there contact between your company and Windesheim Almere and/or ROC Flevoland through an intermediary?

a. Example?

20. Have new forms of contact developed in recent years?

a. Example?

21. Is there contact between the companies on such topics?

a. Example?

Theoretical knowledge:

An academic spin-off is a company whose activities, products and/or services are based on know-how, technology and/or research results generated at the Hogeschool Windesheim or ROC Flevoland (University of Antwerp, 2021).

22. Do you know of an academic spin-off within Logistics Cluster Flevoland?

a. Can you tell us more about that?

23. Is this something you as a company are interested in or open to?

a. Why yes, why not?

Attitude logistic firms:

24. Do you think your company has an open attitude towards educational institutions?

    a. If yes, why?

    b. If no, why not?

25. Is the collaboration of educational institutions within LCF important to your company?

    a. What do you think is the added value?

    b. Why not?

26. Has your company done specific things to attract students from the collaborating educational institutions?

    a. Example / explanation?

<u>Adopted approach LCF organisation:</u>

Officially, Logistics Cluster Flevoland has been around for about 2 years now (founded in 2020).

27. Do you notice a difference in the cooperation / connection with the educational institutions compared to the period prior to the official establishment of LCF?

    a. Can you give an example?

    b. Corona impact? Online meetings, etc.

I would like to thank you very much for participating in this interview. I would also like to emphasize that your anonymity is paramount. I'll share the transcript of this interview (using a pseudonym) with you if you'd like? Would you mind if I contact you again if I still come across a question while analyzing the interview? Do you have any questions or comments?

III Code book

CODE NAME	CODE DESCRIPTION
Academic spin-off	Quotes regarding academic spin-offs
Activity LCF	Quotes regarding the activities Logistics Cluster Flevoland has done, or is doing.
Ambition educational institutions	Quotes regarding the ambitions and/or goals of the educational institutions Windesheim and ROC.
Ambition firms	Quotes regarding the ambitions and/or goals of the (participating) firms within the logistics cluster.
Attitude educational institutions	Quotes regarding how the educational institutions Windesheim and ROC behave towards each other or the firms within the cluster.
Attitude firms	Quotes regarding how the firms behave towards each other and/or the educational institutions Windesheim and ROC.
Automation firms	Quotes regarding firms of which the major operation is the automation business within the logistics sector (i.e., the robotization and automation of processes).
Big firms	Quotes regarding relatively big firms and its activities within the logistics cluster.
Challenges	Quotes regarding specific present challenges within the cooperation mentioned by both the educational institutions and the firms.
Commercial motivation	Quotes regarding specific motivation of firms to do something because it will directly generate revenues.
Connection education and cluster	Quotes regarding the connection between ROC and/or Windesheim and the cluster in general.
Connection with other firms	Quotes regarding the connection between two or more firms within the cluster.
Contradiction SMEs and big firms	Quotes regarding the contradicting attitudes and ambitions of small and medium firms, compared to relatively big firms.
Contribution educational institutions	Quotes regarding the specific contribution of Windesheim and/or ROC to the logistics cluster or to the cooperation with a given firm.
Contribution firms	Quotes regarding the specific contributions a given firm has to the cooperation with the educational institutions or the cluster.
Cooperation assessment	Quotes regarding how both the firms and the educational institutions assess the cooperation between them.
Current collaboration situation	Quotes regarding the current status of the collaboration between the firms and educational institutions.
Delay educational institutions	Quotes regarding the delay in adjusting to new developments within the educational institutions' programmes.

Demand knowledge	Quotes regarding a situation in which is made clear that there is demand for knowledge from the educational institutions by the firms, or vice versa.
Demand physical workforce	Quotes regarding the demand of workforce input through hands and feet, for example having people in the stockroom that can move packages.
Expectation educational institution(s)	Quotes regarding expectations by Windesheim and/or ROC towards other parties within the cluster cooperation.
Expectation firms	Quotes regarding expectations by the participating firms within the logistics cluster towards other parties within the cluster cooperation.
Expectation LCF	Quotes regarding expectations by the municipalities of Zeewolde, Almere and/or Lelystad towards other parties within the cluster cooperation.
Hard factors	Quotes regarding products, technology, equipment, physical location and raw materials in a given situation.
Impact pandemic	Quotes regarding the influence or impact of the covid-19 pandemic on the cluster cooperation or a given situation.
Internships	Quotes regarding internships both from the firm, municipal and educational perspective.
Investment(s) educational institutions	Quotes regarding specific things the educational institutions ROC and/or Windesheim has undertaken or is doing with regards to the cluster cooperation.
Involvement educational institutions	Quotes regarding the involvement of Windesheim and/or ROC in the logistics cluster (within the participating firms)
Knowledge gap	Quotes regarding the presence of a knowledge gap, indicating a gap between what firms expect and what educational institutions deliver with regarding to both theoretical and practical knowledge, or vice versa.
Knowledge mobility	Quotes regarding the transfer of knowledge between the firms and educational institutions within the logistics cluster.
Long term vision	Quotes that indicate that a long term vision is being adopted by either Windesheim and/or ROC or any of the participating firms within the logistics cluster.
Mismatch	Quotes regarding a mismatch between the attitude, ambition, knowledge, or behaviour of firms and educational institutions Windesheim and/or ROC, or vice versa.
Mutual contact	Quotes regarding contact between the firms and the educational institutions, or vice versa.
Practice-related aspect	Quotes regarding practise related situations within the cooperation in the logistics cluster.
Resources educational institutions	Quotes regarding the resources that are available to the educational institutions.

Role LCF	Quotes regarding the role of the organisation of Logistics Cluster Flevoland. Based on the municipal, firm or educational perspective.
Short term vision	Quotes that indicate that a short-term vision is being adopted by either Windesheim and/or ROC or any of the participating firms within the logistics cluster.
SMEs	Quotes regarding a small or medium firm and its activities within the logistics cluster.
Soft factors	Quotes regarding labour force, organisational systems and procedures, management styles and work methods in a given situation.
Starting phase LCF	Quotes that point out the organisation of Logistics Cluster Flevoland is still in a starting phase, or is still developing or figuring things out.
Supply knowledge	Quotes regarding a situation in which is made clear that there is supply of knowledge from the educational institutions to the firms in the logistics cluster, or vice versa.
Supply physical workforce	Quotes regarding the supply of physical workforce, i.e. but not limited to graduated students that can work inside the stockroom.
Theory-related aspect	Quotes regarding theory related situations within the cooperation in the logistics cluster.
Traditional firms	Quotes regarding firms of which the major operation is the, relatively less innovative, traditional business within the logistics sector (i.e. moving things from location A to location B)
What's in it for me attitude	Quotes regarding an attitude of either the educational institutions or the participating firms within the cluster that indicates that a one is only willing to participate if there is a profit to be made.

IV. Coding scheme

TEXT FRAGMENT	OPEN CODING	AXIAL CODING
"Er komen best wel veel spin-offs van theoretische clubjes van onderwijsinstellingen, die uiteindelijk tot een spin-off hebben geresulteerd in een bepaalde oplossing. Dit komt omdat zij anders denken, dan wij met betrekking op ons eigen productieproces bezig zijn, uhm, je moet de kans krijgen om dat te kunnen uitvoeren zeg maar."	Academic spin-off	Logistics Knowledge
"Dat heeft toch wel een tijdje een soort van stil gelegen."	Activity LCF	Attitude LCF organisation
"Onder andere stages, maar wij zijn ook als school bezig met de aanvraag van een RIF subsidie, waarin we in de logistieke branche een aantal dingen voor elkaar willen krijgen, dus wij kunnen ook het netwerk benaderen om informatie uit het netwerk te kunnen krijgen."	Ambition educational institutions	Attitude educational institutions
"Ik weet wel dat er bedrijven zijn die heel veel investeren in onderwijs, ook op andere plekken in het land, dat zijn vaak de wat grotere bedrijven. Die zijn op een veel duurzamere manier bezig met kennis en ontwikkeling, en dat verraad een stukje visie."	Ambition firms	Attitude firms
"Er alles aan te doen, te luisteren naar wat die markt graag wil. Nou ja, ons onderwijs op aanpassen."	Attitude educational institutions	Attitude educational institutions
"Ik geef altijd aan bij de scholen en de leerlingen, als je iets ziet hier in het magazijn waarvan je denkt dat kan beter, kom alsjeblieft."	Attitude firms	Attitude firms
"Je ziet gewoon dat de grote jongens, die ook grote bedrijven achter zich hebben, uhm, aangeven van nou ja wij zetten in op automatisering, dus robotisering en daarmee, personeelsvraagstuk ook te verkleinen zeg maar."	Automation firms	Attitude firms
"Dat verschil zit hem met name in het vermogen om te automatiseren en de wil om te automatiseren. Want je ziet gewoon dat de grote jongens, die ook grote bedrijven achter zich hebben, uhm, aangeven van nou ja wij zetten in op automatisering, dus robotisering en daarmee, personeelsvraagstuk ook te verkleinen zeg maar."	Big firms	Attitude firms

"Het onderwijs zou veel meer gericht moeten zijn op, uhm, het bedrijfsleven, uhm, als je als docent al 10 of 15 jaar les geeft, valt het niet mee om nog de ontwikkelingen in het bedrijfsleven bij te houden."	Challenges	Challenges
"Wij zochten daar eigenlijk een combinatie, een win-win situatie van wij leveren kennis, kunde en veel ervaring in dat cluster en we hoopten dat we dan ook zeg maar de mogelijkheid krijgen om daar opdrachten uit te kunnen mogen voeren."	Commercial motivation	Attitude firms
"Dat heeft geresulteerd dat we nu met bedrijf en student een persoonlijke planning maken, waarin we dus onze inhoud afstemmen op waar een student op dat moment in het bedrijf zijn werkzaamheden uitvoert, zodat die altijd de juiste kennis heeft op het juiste moment."	Connection education and cluster	Attitude educational institutions
"Nou dan kan zo'n logistiek cluster handig zijn, omdat die dan onderling met elkaar praten, en dan zou je elkaar kunnen helpen."	Connection with other firms	Attitude firms
"Ze zijn beide aanwezig, maar ze hebben beide een ander belang."	Contradiction SMEs and big firms	Challenges
"Nou ik denk dat dat niet zo heel belangrijk is, tuurlijk ze leveren wel input, maar om te zeggen dat dat zo significant is, nee, nee."	Contribution educational institutions	Attitude educational institutions
"Wij als bedrijven kunnen natuurlijk onze kennis delen op een bepaald vlak."	Contribution firms	Attitude firms
"De samenwerking werpt wat mij betreft nog niet zijn vruchten af."	Cooperation assessment	Attitude LCF organisation
"Het ROC is wel wat weerbastiger zeg maar, die is wel wat lastiger zeg maar, om ze rechtstreeks, uhm, omdat je ook meerdere hebt."	Current collaboration situation	Attitude LCF organisation
"Een MBO'er is wellicht veel te praktisch ingesteld. En dan ook nog praktisch ingesteld op achterhaalde concepten."	Delay educational institutions	Attitude educational institutions
"Energie transitie bijvoorbeeld lopen we allemaal tegenaan, of omschakeling van diesel naar elektrisch, uhm, of wordt het LPG of stikstof. Weet je dat soort vraagstukken, waar je van elkaar kan leren zeg maar, dat was eigenlijk het doel van de samenwerking voor ons."	Demand knowledge	Attitude firms
"We moeten gewoon nog door met het werven van personeel met de handjes zeg maar."	Demand physical workforce	Attitude firms
"Hier heeft de sector de eerste verantwoordelijkheid, wel kan dit in samenwerking met de scholen"	Expectation educational institution(s)	Attitude educational institutions

"Dat ROC dan voornamelijk voor logistiek personeel en het opleiden daarvan"	Expectation firms	Attitude firms
"Ik weet waar het cluster zich bevindt, en hoe groot het netwerk is, dat heeft nog tijd nodig om verder te groeien. Op zich verlang ik niet zo heel veel van ze."	Expectation LCF	Attitude LCF organisation
"Hoe makkelijk het is om jezelf hier te vestigen en hoe makkelijk het is om aan werknemers te komen. En ook voor werknemers om hier die huisvesting voor elkaar te krijgen. Het is meer als alleen maar één voorwaarde."	Hard factors	Attitude Firms
"Je bent toch afhankelijk van de netwerk bijeenkomsten die er zijn. En die hebben we echt nog niet gehad. Dat heb natuurlijk ook met corona te maken."	Impact pandemic	Challenges
"We hebben altijd wel 3 a 4 stagelopers, nu eentje van het ROC, uhm, en er lopen er twee van de praktijkschool de Steiger."	Internships	Logistics Knowledge
"Ik wil vooral richting de uitvoering van mijn subsidietraject want daar in heb ik hele mooie dingen staan voor de arbeidsmarkt die bij kunnen dragen de verduurzaming daar van, uhm, dus dat is denk ik waar ik heen wil."	Investment(s) educational institutions	Attitude educational institutions
"Ook is ons kenniscentrum betrokken op het gebied van supply chain vraagstukken."	Involvement educational institutions	Attitude educational institutions
"Het verschil tussen de theorie zoals, uhm, alles bedacht is ten opzichte van hoe de praktijk werkt daar zit gewoon een groot verschil tussen."	Knowledge gap	Logistics Knowledge
"Dat zal niet helemaal gelijk zijn. Want bij de MBO gaat het dan voornamelijk over de medewerkers op de werkvloer, dus dat is meer handjes en voetjes. En bij een Windesheim zal het meer echt op het verwerken van data en dergelijke."	Knowledge mobility	Logistics Knowledge
"De onderwijsinstellingen hebben echt wel die slag gemaakt en laten zien zeg maar dat ze dat willen, en bijdrage geleverd. Uhm, alleen dat is wel voor die lange termijn."	Long term vision	Attitude educational institutions
"Kijk, als je een docent hebt, nouja niet uit het bedrijfsleven komt, dan weet hij denk ik minder goed wat er in het bedrijfsleven speelt, en dat is logisch. Uhm, dus daar zul je iets voor moeten verzinnen"	Mismatch	Challenges
"Er moet bereidheid zijn bij de bedrijven om mee te participeren bij dit soort projecten die ik net aanhaalde, maar er moet ook urgentie bij het onderwijs zitten	Mutual contact	Attitude educational institutions

om zodanig met het bedrijfsleven op te trekken."		
"Als je kijkt waar de bedrijven het meeste voordeel zouden hebben, zouden die eigenlijk bij de ROC's zijn en wat minder bij de, nouja de theoretisch geschoolde mens."	Practice-related aspect	Logistics Knowledge
"Natuurlijk wij leiden ook gewoon hier tussen de 50 en 100 uhm, logistieke studenten op, dus ja dat, de handjes leveren wij ook in die zin. Maar wel lang niet genoeg voor het vraagstuk dat er ligt."	Resources educational institutions	Logistics Knowledge
"Kijk de kracht van het logistieke cluster is natuurlijk het oliemannetje zijn, het samenbrengen van alle partijen, maar 1 op 1 contact tussen onderwijs en bedrijven, ja graag zelfs."	Role LCF	Attitude LCF organisation
"Daar ontbreekt het op dit moment wel aan, is er daadwerkelijk wel de echte vraag waar ze mee zitten? Of is dat echt de vraag die alleen maar vandaag geldt?"	Short term vision	Attitude firms
"De MKB'ers en de familiebedrijven die geven vaak, die zijn vaak stand alone ook, en die zeggen heel snel van, wij, wij produceren op de traditionele manier"	SMEs	Attitude firms
"Ook de zachte kant, wil ik daar wel, wil ik in dat gebied bijvoorbeeld wel wonen? Dan moet er ook toegang zijn tot theater, sporten, alles moet er ook zijn zeg maar."	Soft factors	Attitude Firms
"Ik bedoel, de gemakkelijke dingen zijn snel te halen, die kan iedereen halen, wat we tot nu toe gedaan hebben, is misschien wel door iedereen te halen, maar om het echt daadwerkelijk tot een succes te maken moet iedereen een stapje meer willen doen."	Starting phase LCF	Attitude LCF organisation
"Vanuit het hbo wel, omdat in onze kenniscentra veel innovatieve kennis aanwezig is"	Supply knowledge	Logistics Knowledge
"We komen in Nederland zwaar mensen tekort die met de handjes werken, dus de praktijk geschoolde mensen komen we tekort"	Supply physical workforce	Logistics Knowledge
"Daar zit echt tot en met, uhm, vanaf het uitpakken van vrachtwagen of vliegtuig vandaan, tot en met het inpakken van verzenddoosjes, daar zit echt een heel stuk logistiek denkwerk achter"	Theory-related aspect	Logistics Knowledge
"Plukon is groot geworden in kip, en kip vlees is toch van oudsher wat traditioneler, weet je dat duurt wat langer om uhm, om, nouja,	Traditional firms	Attitude firms

duurt wat langer om innovatief te zijn zeg maar."		
"En daar zie je wel dat de bedrijven ook, uhm, opzich, ze steunen het initiatief van het LCF, maar er zit ook wel wat weerstand in, de vraag is altijd whats in it for me?"	What's in it for me attitude	Attitude firms