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Challenges and opportunities in the tight Dutch IT labour market

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ABSTRACT

Digitalization has profoundly permeated our lives. In Europe; The Netherlands, together with Finland, Sweden, and Denmark, are digitisation leaders. This intense use of technology asks for specialized IT professionals to manage it. Focusing on The Netherlands, there is a scarcity of IT professionals on the labour market. In order to gain more insight into the diverse perspectives employers have on the challenges and solutions around recruitment and retention of IT professionals, an exploratory-explanatory qualitative research design was operationalised and 36 semi-structured in-depth interviews were conducted with one or more representatives of SMEs and larger organisations. The outcomes showed that both, SMEs and large companies have vacancies and an increasing demand for support with digitisation and that the market demand mainly requires senior staff which are difficult to recruit and retain. Large companies mainly focus on IT knowledge while SMEs focus on 'cultural fitness'. Both types of organisations practise "aggressive" forms of recruitment and they would prefer and focus on "more organic" forms of recruitment. The in-house recruitment is present mostly in large organisations and training and knowledge development is an important tool for recruiting and retaining staff in organisations. The recruitment focuses on more income, influence and involvement, by improving the primary and secondary employment conditions where well-being and maintaining a healthy work-life balance are of utmost importance.

1. Introduction

Recent reports by Statistics Netherlands¹ (2021) show that the Netherlands, together with Finland, Sweden, and Denmark, are digitisation frontrunners in Europe. The Dutch digitisation agenda [1] is fully aligned with the digitisation policy of the European Union [2] as clarified by the European Commission (EC) [3–5] focusing on three focus points: (1) digital technology that works for people; (2) making people more digitally competent and protecting them from cyber threats; and (3) a fair and competitive digital economy.

According to Statistics Netherlands (2021), the Netherlands had the fourth most advanced digital economy in Europe in 2019. Furthermore, compared to other developed countries, the Dutch in general score high on all digital skills. Due to the intense and rapid digitisation in private and work contexts, the number of ICT companies in the Netherlands has

exponentially grown in the last decade. For example, in 2019, the Gross Value Added of the Dutch economy came largely from the ICT sector. New ICT applications, such as big data analytics and artificial intelligence, are deeply incorporated in Dutch business processes. This increase of production and usage of digitised systems in private and work contexts presuppose the existence of experts to manage and control these systems. Despite Government's policy ([6]; SER, 2021) of investing in digitisation in businesses and society, in the last years, it has been less successful in filling in the growing number of ICT vacancies in the Netherlands. According to the Dutch Employee Insurance Agency [7], the annual number of students who complete an ICT study and enter the labour market is not sufficient to compensate for the number of departing employees (e.g. outflow, retirement). In addition, for the ICT sector it is expected that the number of new ICT companies will continue to grow [8]. Becker and Bolink [9] and Troitiño [10] expect the

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economy, and especially the ICT sector, to grow faster than study programmes succeed to train qualified specialists to fill in these vacancies. The World Economic Forum [11] describes the IT profession as the fastest growing roles in the world, while worldwide the labour markets in developed countries remain tight [12].

Edzes [13], Preece [14] and Tordoir et al. [15] argue that there are sufficient professionals on the Dutch labour market. However, schools and educational institutions do not always deliver graduates that are ready-to-start for the specific jobs [16–18], and employers must learn to look for ‘talent’ and organise work (onboarding) differently [19]. Nonetheless, there are not enough IT specialists in general, and in the Netherlands especially in the North of the country where the scarcity of IT talent is severe. There has been a serious mismatch on the Northern ICT labour market since 2015. SMEs in the North of the Netherlands have been indicating that they barely find candidates for their ICT vacancies (SN, 2021 [20]). Since the 2000’s, the Dutch labour market for ICT has transformed into a seller’s market, where employers need to be more creative and persistent to get the employees they need [21]. The tightness of the labour market means that the search for employees must focus on other aspects than just income, like life satisfaction and happiness. Focusing on these job-related aspects improves the matching and fulfilment of vacancies [22]. Employers often include different additional benefits for employees that help attract professionals by making their offers stand out from other companies that have similar openings (e.g. employee benefits can vary widely from health-related and retirement benefits to student loan support and workplace amenities (on-site gym, snacks/food provided, etc.) [12].

Tight labour markets are not a new or recent phenomenon, and many professionals and academics have thought about strategies to dealing with the shortage of available labour force for certain sectors for decades [21]. This generates staff retention and turnovers become pressing employment issues [23]. This means that more traditional methods for recruiting labour are no longer sufficient and new methods must be found, such as flexible work practices and the different types of labour/workforce flexibility (Crowley-Henry, 2013); or when offering higher wages does not do the trick, the re-evaluating of the values of certain job characteristics to improve the quality of the job [24]. Becker et al. (2020) speak of the ‘war for talent’, arguing that paying more for these talents only solve tight markets in one area, but depleting other areas of skilled ICT workers. As a result, the problem is no longer local, but (inter)national.

To solve this, Henkens et al. [21] describe three possible strategies. The first strategy suggests using informal recruitment techniques – word of mouth, personal ‘advertising’, employees’ personal networks, as well as actively engaging in job fairs for students. The OECD [12] adds that most successful ways to fill successful openings is by positive referencing from current employees, rather than by extending the work packages with additional benefits. The second strategy is recruiting via the internet, creating visibility on vacancies platforms and job-search engines. According to Collins (2020) and OECD [12], it is no longer enough if one wants to expand the human resource based model, but a bare minimum should be a combination of resource adjustment (for example automation or job carving), education and different work packages offered. Novriana and Soegoto [25] suggest that there should be more focus on humans as the primary components that are able to create new values on the work floor. The last strategy is the effect of local governmental instruments. From the employer’s side several strategies can be applied to increase the number of employees. From the Dutch view, due to the economic growth around the turn of the millennium, the employers were increasingly presented with situations where none or a limited number of people responded to their vacancy [21].

The HRM literature divides these search strategies into active and passive recruitment strategies. Where a candidate approaches the organisation, it is called passive recruitment and when employers go and search for applicants, for example by commissioning recruitment agencies or search on linked in or cooperate with educational

institutions to select promising students, it is called active recruitment [26]. Furthermore, there is the distinction between formal and informal recruitment. Posting a job vacancy in (social)media outlets or using an intermediary to help search are examples of formal recruitment (Linan et al., 2002 [27]). Often, organisations use a mix of recruitment methods [21]. Research on place of sense and employees’ belongingness adds to these results [28,29]. Raza et al. [30] find even a direct and significant effect of job crafting and leadership on workplace belongingness are significant. This leads to the idea that generating sense of belonging can also be part of strategic HRM management [28].

The Dutch government presented support plans on labour market shortages in the climate and digital transition: The Green and Digital Jobs Action Plan (February 2023) proposing four pillars. The first pillar addresses education and proposes increasing the intake in science and technology education study courses by offering strong technology education and technology promotion tracks. The second pillar refers to companies with a view on maintaining and increasing the inflow from the labour market. These first two pillars will be safeguarded by focusing on labour productivity growth (process) innovations and digitisation (the third pillar); strengthening governance and combating social, economic and societal fragmentation by taking an active and clear role in this (the fourth pillar). The Dutch Government intends to search solutions to the scarcity of talent on the IT work market by focusing on solutions on how to a) make work more rewarding, b) increase the labour supply and c) financially support the transition from workers to structural shortage sectors. Similar programs were created around the world, (for an overview see Ref. [31], or Ferragina et al., 2023), for example in Indonesia [25] with a special focus on maintenance of training and certification.

In order to gain insights into the diverse perspectives employers in the North of The Netherlands have on the challenges and solutions around recruitment and retention of IT professionals, an exploratory-explanatory qualitative research design was operationalised. The main objective of this study was to gain more insights into employers’ perspectives and actions regarding recruiting and retaining staff for IT positions. To this purpose we formulated two research questions: (1) How does individual employers’ demand for IT-related labour compare to its supply in the North of the Netherlands? and (2) What are some concrete actions employers take in order to recruit and retain staff for IT roles in the North of the Netherlands?

An exploratory-explanatory approach was adopted, for the aim of the study was to tap into (explore) the SMEs and larger companies employer’s perceptions and strategies in order to explain the challenges and solutions around recruitment and retention of IT professionals. Since the study was a subsidised EFRO project the north of the Netherlands as context was established by the contractor IT Academy Northern Netherlands who had a particular interest in exploring these aspects in this geographical region. The Make IT Work in the North coordinators were specifically interested in exploring and evaluating the ways IT and non-IT SMEs and large organisations deal with the scarcity of IT personnel, more exactly recruitment and retention of IT professionals, which has been reported to be more scarce in the north of the Netherlands compared to other regions. In order to explore and grasp a thorough understanding of these complex aspects it was decided that a qualitative approach was suitable to use.

In the following sections, the operationalisation of the design, procedure, data collection, data analysis methods, results, conclusion and discussions, limitations and some directions for further research are presented.

2. Method and procedure

An exploratory-explanatory qualitative research design was operationalised by conducting and analysing semi-structured interviews with one or more representatives of approximately 36 organisations (SMEs and large) in the Northern of the Netherlands.

A total of 194 SMEs and larger organisations in the North of the Netherlands were mapped, using the directory with the companies in the North of the Make IT Work in the North project (See footnote 1)[32], of which eventually 91 were invited for an interview. The approached companies were selected considering the geographical location (the North of the Netherlands, consisting of three provinces Groningen, Friesland and Drenthe), size (SME or larger) and sector (IT/non-IT) trying to have enough representativeness of all these criteria in the sample. In total, 36 in-depth interviews were performed with HR representatives and CEOs, mostly individually, but sometimes accompanied by another company representative. In Table 1 the exact number of selected companies per size of organisation, response, sector and location is presented.

The topics and interview questions were developed based on the theoretical review above and considering the objective of the research and the context of the IT labour market in the Northern of the Netherlands. The two main research questions were broken down into smaller sub-questions, namely: for the first research question: How does your demand for IT-related labour relate to its supply? the following sub-questions were formulated: What is your current need for IT labour? What do you notice about shortages of IT specialists and ageing? What is the cause of this shortage of IT specialists? What worries you and why? The second research question: What do you do to recruit and retain staff and lateral entrants for IT positions? was supported by the following sub-question: In what way has the HR policy been (differently) adjusted in the past 2–3 years to better meet the demand for labour for IT functions? here topics like organisation function structure, terms of employment, recruitment and selection, onboarding, management (e.g. tasks and roles) and development and training were discussed.

All interviews took place via Teams due to the restrictions imposed due to the Covid-19 Pandemic lockdown between November 2021 and March 2022. Each interviewee was given an informed consent form to sign and was informed on the purpose of the research, how the data would be handled and analysed. Each interview lasted about one hour. All interviews were recorded with the interviewees' permission in order to be transcribed (manually and with the transcription generated by Teams) as literally as possible and elaborated in separate anonymized reports. These reports were imported in the data analysis program Atlas.ti, coded and analysed. A top-level codebook based on the two research questions was made which included the following main codes: demand and availability IT labour and characteristics of IT labour market; organisational structure; characteristics of employees; terms of employment; recruitment and selection; onboarding, training and development. These codes were operationalised from the theoretical review on the topic.

The top-level codebook was tested (top-down) on two reports to see if the codebook was complete and sufficient for the data analysis. Subsequently, the codebook was supplemented with extra subtopics for each main topic. The final *code book* is available on request. The analysis included a 'red thread analysis' based on separate exports of all coded passages per main topic, broken down for small and larger employers, supplemented by more specific exports on some of the various subtopics. This led to the writing of summaries per main topic which are presented in the results section in relation with each research question.

Having designed and improved the coding scheme helped us in producing more valid and reliable results for it helped with (1)

categorising and organising the information in a structured way, making it easier to analyse and interpret data; (2) providing a standardised way of representing information, thus enhancing communication, understanding and a common language or framework among researchers; (3) enhancing the data analysis process by identify patterns, trends, and insights within the data set; and (4) maintaining the quality and consistency of data by providing a systematic way to label and organise information, hence reducing errors and ensuring reliability in analysis.

3. Results

In this section, the results of the data analysis per research question are presented. The results are supplemented with illustrative statements from respondents to support the themes generated in the outcomes. The outcomes are differentiated between SMEs and large companies, because the results indicated that making this difference is important in the different recruitment strategies by size.

3.1. Results first research question

Regarding the first research question referring to how individual employers' demand for IT-related labour compare to its supply, the following topics have been found.

Firstly, *both, large organisations and SMEs are likely to have vacancies*. The shortage on the Dutch labour market manifesting itself in more and more sectors is also widely recognized by the respondents. Almost all of them indicated that they had been dealing with open and often continuous vacancies. They do not yet experience this shortage as an insurmountable problem, but it does take considerably longer to be able to fill in the vacancies. SMEs usually have one to three vacancies, as one interviewee of a small business observed:

"The need for people/talent is great and constantly growing. We now have five vacancies but next year we will have more. [...] It takes about a year until I find a suitable person [...]."

While larger companies referred to more than ten vacancies, but they experience this phenomenon as less severe:

"We are not yet suffering from shortages or ageing. I don't see that yet. Because we now work together with the IT hub, so with vocational education institutions, colleges and university. I do see a lot of opportunities for us."

Or some believe that employers can and should do more to obtain that most needed talent:

"There is no talent shortage. There is, but it's not as it has been popularised. We can no longer find the "sheep with five legs" because the market has changed. If you have a vacancy as a company, then we are all going to shout: "there is scarcity!", because I cannot find someone to fill it in, while the solution is there. Organise your work differently so that you get young professionals, or that you get recent graduates. Companies should reserve about 10% of their vacancies for young professionals."

Secondly, both SMEs and large organisations notice *an increasing demand in the market for support with digitisation*. For some employers this is due to the impact of Covid-19 Pandemic. As a result, more clients

Table 1
Selection respondents considering the size, sector and location.

Company size		Sector		Location (by province)			Total interviewed
SME ^a	Large ^b	IT	Non-IT	Groningen	Friesland	Drenthe	companies
17	19	21	15	20	9	6	36

Note.

^a An organisation with 250 employees or less.

^b An organisation with 250 or more employees.

want to digitize their services for customers faster. For example, they developed a stronger desire to be able to digitize internal (collaborative) work processes more quickly in order to facilitate the increasing demand for remote working. In addition to this increasing internal demand, many employers are also noticing an increasing demand for support from their clients after the implementation of digitisation processes. Companies notice an increase in demand, not only for the development of IT systems, but also for ongoing management and support in the daily use of IT systems, including more general 'consultancy'. Moreover, there are signals that more customers are asking for support in the configuration of standardized low-code and/or cloud-based solutions. In addition, the demand for knowledge in the field of data architecture, business intelligence, data analytics, and information management is growing. Finally, employers see a growing need for the development of so-called 'management organisations' in which a large part of the 'hard' IT is outsourced outside the organisation. In other words, questions in the market can no longer be answered with just some 'harder' IT knowledge, but *people are looking for a broader spectrum of ICT employees.*

Thirdly, *the market demand mainly requires senior staff which is difficult to recruit and retain* in the current tight labour market. In general, SMEs and large organisations emphasize the fact that the market is increasingly demanding senior staff. The reason for this is that the projects are complex and customers demand complex IT solutions and only senior staff who have the knowledge and experience can perform at that level (e.g. new languages, platform development, 'translation' of software into feasible integration into internal business processes, data monitoring and analysis, need for possibilities for independent management and configurations). Also, employers emphasized that senior staff tend to display and master at a higher degree the much needed 'soft skills' that keep constructive contact and cooperation with the demanding customer, while younger talent display less developed soft skills. The following comments illustrate these aspects:

"[...] we are always looking for more experienced people, only that we cannot find them easily. We can find starters fairly easily, [...], but the supply of people who are a bit more experienced is just a lot lower, because they already have a job and are less likely to look for something new."

For some senior employees, there are substantive and financial obstacles to being able and willing to make a switch. Senior employees seem less inclined to switch jobs due to private interests. After a number of changes, seniors have often 'landed' with an employer and more often need a piece of stability at work. Another part of the seniors is indeed considering (often for financial reasons) a switch to, in particular, secondment and self-employment (often focused on consultancy and cloud expertise). Furthermore, SME employers in particular feel vulnerable in the recruitment of sufficiently qualified senior staff. The Northern IT market has only a small number of large employers and a large number of smaller and also highly specialized start-ups and scale-ups. Graduates who start working at start-ups and scale-ups develop a fairly narrow knowledge base, while those who start working for larger employers often develop a very broad knowledge base, but also get used to a relatively high salary. In practice, this means that especially the somewhat larger SME employers seem to have more difficulty finding new senior employees with sufficient knowledge and experience. An interviewee expressed this as follows:

"It is difficult to find experienced people, as mediors and seniors. That pond is now empty throughout the country. In addition to our recruitment, we also have external hiring. Our partners also indicate that they do not have unemployed people. [...] That is why we are putting extra effort into our own training of new people. Recruiting juniors is easier."

Lastly, many employers highlight the concerns they have about the *increasing pressure and reliance on their senior staff* combined with the growing demand for their knowledge and expertise, and consequently,

employers sometimes choose not to recruit juniors as an interviewee observed:

"Our experienced people are now quite often working below their level because we have too few juniors. [...] But we prefer to have more experienced engineers."

In their eyes, their senior staff has an important role in training juniors. Seniors simply do not have enough time to be able to train new juniors. Further, overloading the senior staff obviously has limits and employers fear they may lose the seniors due to illness and/or departure due to dissatisfaction with their own work (e.g. too high work pressure, forced to do junior work, too low salaries, etc.). Several respondents recognized this situation:

"[...] That middle segment, that's where the shortage is. People in this middle segment have a number of years of work experience and not yet too expensive, and you just need them to take all those young people onboard. [...]"; "[...] seniors will soon be leaving and a kind of brain drain arises as a result. [...] Older employees are very welcome, because you need that experience very much, when it comes to thorough knowledge and experience to deal with a customer and to execute a project. [...] But this quickly turns into a discussion about costs, for older employees are much more expensive."

3.2. Results second research question

Regarding the second research question referring to *what organisations do to recruit and retain staff for IT roles* the following topics have been found. The outcomes are presenting differentiating between SMEs and large companies.

Firstly, both SMEs and large companies recognize that *recruiting and retaining IT staff has become an ongoing and proactive challenge* considering the way in which employers deal with the shortage (e.g. volume, knowledge, expertise and experience). In order to attract and retain the needed talent SMEs and large companies take active steps in many areas at once. For example, large companies start searching internally as this one interviewee mentioned:

"If there is a vacancy, then an internal or semi-internal search must be carried out and if there is no suitable candidate for this yet, we can search externally and that takes a lot of time. Or I get an external agency, which will then do the recruitments. [...]"

While SMEs mainly screen and recruit themselves:

"We recruit ourselves via LinkedIn, our own website, network deployment, but also by visiting institutions of teaching, especially that part, because I believe that if I look for someone, for example a college student, then I go to a college."

Secondly, *large companies mainly focus on IT knowledge while SMEs on 'cultural fitness'*. In particular, it was observed that large companies tend to focus on recruiting starters and juniors with a solid IT background in order to be able to train them more quickly to be able to independently perform senior tasks in projects, as one large company representative remarked:

"We make software for thousands of customers, and they need to be error-free. We need to have people who can think of what can go wrong, and then be able to do it. That attitude is more important than the substantive knowledge that someone brings."

SMEs often choose to recruit staff that mainly fits the 'culture' of the organization. They claim that the right 'mindset' is more important than having the right IT knowledge, therefore, they look for flexible, teachable and malleable staff who love 'puzzling' (which, after all, is the core of many ICT functions). If they have that, the expectation is that these

employees will not leave soon. Any missing IT knowledge and experience is relatively easy to develop through on-the-job training, internal knowledge sharing and/or external course offerings, according to the estimate, as observed by a respondent:

"[...] We appeal to your entrepreneurship, maturity and 21st century skills [...]. If you report a problem, or you are bothered by something, we will look for a solution together.", and "If someone has real talent and still doesn't fit the culture, then we also tell that person that he/she should better look for something else in a different direction."

Recruitment is usually aimed at students, in particular, and larger companies also recruit abroad more often than SMEs, in countries such as India, Romania and Ukraine. They sometimes enter into long-term agreements with such companies to gain access to experienced professionals in those countries. In addition, they increasingly use freelancers and secondment companies for temporary hiring.

Thirdly, *SMEs put more emphasis on the social added value of work*. In the light of the current labour market shortages, the outcomes of the data analysis showed that in particular SMEs deliberately put less emphasis on pursuing economic growth as an end in itself. Due to the uncertainty about the extent to which they (in the long term) have sufficient capacity to be able to carry out assignments properly, they deliberately contract fewer assignments. Instead, they put more emphasis on pursuing sound implementations of core values such as having 'socially relevant work', CSR, a nice open working atmosphere/organisational culture, and/or wider opportunities for strong formal and informal involvement of the staff in the organization.

Fourthly, both SMEs as well as large companies admit that *broader recruitment can give access to other knowledge and experience*. They suggest that the currently common recruitment approaches, which mainly result in hiring staff who are young and white and have a beta background, should be broadened, which might partly solve some of the labour market shortage in volume and also mismatch in knowledge and skills. It is also expected that more *diversity in organisations* (e.g. gender, age, expertise, experience, country of origin) will have a positive effect on the innovative power and working atmosphere. In addition with a focus on generating more diversity in the organization through *external lateral inflow*, some large and small employers actively focus on generating *internal side inflow*. For example, they look at whether they can entice younger staff without an IT function to develop towards IT functions. And vice versa: whether they can entice older staff with IT functions to play a greater role in the performance of non-IT-related tasks. At the same time, employers also indicate some concerns about the impact of increased diversity on daily work in the projects and culture of the organization. This is especially true when it comes to personnel from foreign countries. For example, they wonder whether the incumbent staff can and want to move along with the use of English as their primary language of instruction. The question also arises whether mutual cooperation and maintaining contact with colleagues abroad will not hinder the quality of the execution of projects and job satisfaction. For some employers, that doubt is so strong that they do not dare to take that step.

Fifthly, both SMEs and large organisations recognize *the practices of aggressive forms of recruitment* which are a problem. The tight labour market is leading employers to take advantage of as many ways as possible to reach potential employees as one concerned respondent has expressed:

"You just see that there are so many companies looking for talent and that we are all fighting with each other to bring them in. That's the concern you have."

Both large and small employers mention a growing dissatisfaction with the use of commercially operating recruiters in particular, because they charge fees, that for a growing number of (especially SMEs) companies, are no longer in proportion with what they deliver. In some cases, they no longer guarantee a successful match and allow themselves

to be paid for only the effort they make. Some employers describe commercial recruitment as 'aggressive' and as forms of modern 'human trafficking' that they increasingly do not agree with and object against:

"I prefer not to work with external recruitment and selection agencies. I think that's a waste of our money to spend € 10.000 to € 15,000 on a one-off fee to them. [...]"

Especially larger employers are able to organise *in-house recruitment*, and therefore, they are less dependent on external commercial recruiters. A representative of a large company told about their organisation:

"There is a lot of hidden talent in the organisation, and the advantage is that these people are well acquainted with our business processes. So, moving on to an IT function, is then doable. I then map out the skills of someone who is potentially able to fulfil an IT function, but I don't expect to find a senior official within the organisation so quickly, because that is really more difficult."

More independent 'aggressive' recruitment of new staff among employees of competitors also feels increasingly uncomfortable. Nevertheless, many employers still seem to do this, more or less pro-activity, directly and/or visibility.

Sixthly, *SMEs and larger companies would prefer and focus on a "more organic" form of recruitment* instead of using 'aggressive' forms of commercial and independent recruitment. They would prefer to approach the Northern labour market as a 'carousel' where employers could and would 'pass on' staff based on a piece of pragmatism and mutual trust, depending on the wishes and needs of both employers and employees. This primarily involves developing and maintaining a 'close' network. The companies do this, for example, by regularly attending relevant cocktail meetings and events with other partners and/or their employees who show interest in and are open to collaborate. They give more attention to the corporate website and social media channels on which they better describe their own projects, and place more emphasis on the culture/atmosphere that they strive for as an organisation and the values they find important, as well as what the intrinsic motivation of employees is. Some organisations actively share online concrete pieces of codes to be able to discuss them with others. In doing so, they not only show more openness in what they deliver, but also express pride in their own results. In addition, there is more attention to giving presentations during events and also as guest lectures in schools (colleges and universities) accepting internships of students and participating in local and regional events.

"What we mainly do is to be visible, by working a lot with others and in all kinds of working groups. One of our main pillars is sharing and collaborating with others. [...] As a result, we are quite well known and vacancies always generate responses. Some colleagues also give guest lectures. As a result, we are visible to students, some of whom come to graduate with us and later also work with us. [...]"

"We are constantly looking for a good working team. We are constantly looking for the right people, via LinkedIn, networking, cooperation with secondary schools, colleges and universities".

Seventhly, *training and development is an important tool for recruiting and retaining staff* in organisations, and customization is often the starting point where employees draw up personal development plans that form the basis for the choice of internal or external training courses. Especially in large companies these plans are organised structurally making use of external training institutes for specific wishes. For more generic training linked to technology that the employer often works with, the *in-house* approach is used. In large organisations periodic assessments and appraisals of career development plans are performed. At many SMEs, the opportunities to learn and develop are more informal, although they offer room to make use of trainings from external providers (which often involve forms of online self-study), they mainly see

added value in learning and development while working on projects (on-the-job training), during internal knowledge sharing sessions and under the form of coaching (often given by seniors). Career development plans are often drawn up more informally and are also monitored and adjusted less systematically. On this topic, an interviewee observed:

"Training is simply offered to staff members, and retraining is therefore perfectly possible. If people want to gain more experience with Python, for example, we can do so hands-on, learning by doing. [...], there is a lot of emphasis on training people internally [...] and training courses that we purchase, [...] or e-learning, [...] or our own e-learning system [...]."

Eighthly, both in SMEs and large organisations there is more focus on offering more income, influence and involvement (within limits), by improving the primary and secondary employment work agreements. Large companies are more easily able to pay relatively higher salaries and use higher margins, and they earn on the deployment of relatively junior staff (accelerated development) to positions where more senior staff is required or desired. SMEs set up the employment conditions as 'market-based' as much as possible, but also consciously set clear boundaries. For example, it must be financially feasible for the employer and, above all, it must not lead to dissatisfaction among staff members, as an SME respondent remarked:

"The terms of employment are according to the law and their expertise, age and work role and function, seniority, but [...] a lot is possible."

Smaller employers in particular are committed to providing 'extra' income opportunities, influence and involvement in the organisation. They experiment with forms of co-ownership, profit distributions and bonuses for performance and delivery of referrals. Both large organisations as well as SMEs offer new staff a permanent contract more quickly. For seniors that seems to be the standard procedure at the moment of employment, while for juniors at a first extension of the work contract. For SMEs this does cause concerns, because it dilutes the pool of mobile workforce and makes them more vulnerable to market developments and fluctuations. These aspects were presented by a respondent as follows:

"We have a specific company philosophy. If you work with us, you get the opportunity to become a shareholder, [...], and with that you become partly owner of the company. That just makes work more fun. I have no opinion on whether you work 3 or 5 days a week, because you are co-owner and you do what is best to balance work, ownership and private life. [...] I don't need to know and certainly do not to ask me for approval. You have to decide for yourself. It's your trade-off. That is of course reflected in how many shares you buy and how much responsibility you want to take. There is a lively trade between employees. If you need a dormer window, you sell some shares."; or "We did take a good look at ourselves as a small company. What can we do to be interesting for candidates? So, we have set up a separate retirement fund."

Ninthly, large companies as well as SMEs pay a lot of attention to promoting "well-being" as secondary employment conditions, in addition to a strong commitment to improving primary employment conditions. For example, there is more focus on providing a good onboarding process, which is more formal and standardised in larger organisations than in SMEs. Often, the new staff get a personal buddy and an onboarding programme to understand the organisation, to become familiar with the culture, processes, systems and get to know most relevant colleagues.

It also became evident that many organisations put conscious effort in maintaining a healthy work-life balance. They offer comfort by less tightly controlling the number of hours that employees make and keep more flexible work hours. Some employers indicate that they also give employees more freedom to spend (a limited part of) their working time on personal social activities they find important and which are difficult

to combine with their work obligations. A respondent illustrated these aspects in the following way:

"We are very flexible regarding when you have to work. I can't determine that for anyone. If you want to start at 8 a.m. or 10 p.m., you have to decide for yourself. [...] I also don't check the hours they write. I'm assuming they do. If it doesn't work out this week, I expect you to make up for it next week. I trust you will do that."

Finally, the outcomes of the data analysis showed that companies in general and SME in particular tend to invest more in offering a nice workplace as the majority of respondents declared. In some cases, this translates into the establishment of a formal position as *Chief Happiness Officer*. Their primary task is to tap into the staff's satisfaction and work balance (e.g. content, culture, systems, etc.) and private life (e.g. housing, care, citizenship, hobbies, etc.). Where necessary, individual and/or collective measures are taken to improve this balance, like the organisation of informal activities such as drinks, joint lunches, joint holidays, as well as very practical workplace improvements such as comfortable and relaxing seats, plants and massage chairs, financial plans for purchasing a bicycle from the company. In addition, we observed that SMEs focus more on facilitating more dialogue about the involvement in internal decision-making (mostly in flat organisations), giving more individual choice in choosing what they want to study, web services and technology than large organisations.

4. Conclusion and discussions

Regarding the first research question on how individual employers' demand for IT-related labour relate to its supply, the outcomes of the data analysis showed several aspects. Firstly, both SMEs and large employers have continuous vacancies and employers believe that the scarcity of IT professional will only increase. The scarcity of IT-related talent is explained as partly due to retirement, lower inflow of fresh graduates, and loss of ambitious young professionals that choose to work for companies in the South of the Netherlands which is known to be more competitive and offers higher financial compensation. These findings confirm the recent analysis of the IT talent capacity in the Netherlands (SN, 2021, SER, 2021 [20]), but at the same time there are also studies that suggest that there are solutions to remedy this situation. For example Edzes [13], Preece [14] and Tordoir et al. [15] claim that there is enough talent on the Dutch labour market which needs to be found in the inactive working layers of the society, and employers need to organise their work differently and training staff members with a non-IT background and fostering more international relationships might be a solution. As solution, Collins (2020), and Novriana and Soegoto [25] suggest the human resource based model should be altered by adjusting resources, education and different work packages offered with a strong focus on humans' work-life balance and happiness.

Secondly, we conclude that almost all employers notice a growing digitisation demand in the market (partly reinforced by the Covid-19 Pandemic). More specifically, they see an increase in the demand for 'configuration' work, translation of ICT into business (e.g. data analysis), and the broader consultancy work (e.g. architecture, direction). This increased demand is explained due to the fact that the Netherlands is the fourth most advanced digital economy in Europe compared to other developed countries, with an increasing number of ICT companies in the Netherlands that generate a large proportion of the gross value added of the Dutch economy. Furthermore, the outcomes showed that respondents notice that a great part of available IT work in the North of the Netherlands needs to be executed by many startups, which tend to use specialized IT professionals, and larger organisations, which tend to use more generalist IT talent. This trend is explained by the fact that SMEs have limited financial and training capacity possibilities and tend to hire specialized IT professionals, while larger organisations have more financial and training capacity possibilities and they can afford to invest in young talent or retraining professionals from another field to fill in the

gaps (SN, 2021).

Thirdly, it can be concluded that in order to be able to meet the growing market demand, senior IT staff is especially needed. Due to the shortage of senior IT staff, the existing seniors are forced to work below their level of expertise and also have a role in training beginners, which results in a lot of pressure for them. As a result of the increased work pressure and competitive offers from other employers, employers are particularly concerned about the drop-out and/or departure of their senior staff. These observations reported by interviewees are in line with the outcomes published in the literature (SN, 2021), where it is also reported that this trend is unlikely to change since the scarcity of senior IT talent in particular and IT specialists in general is not going to be solved any time soon. The reason is that technology is incorporated in the work and private life faster than schools and organisations can train IT professionals [8–10].

Regarding the second research question on what employers do to recruit and retain staff for IT roles, we observed the following. Firstly, recruitment and retention has become an ongoing challenge for most SMEs and large companies. Senior IT professionals are in high demand, and to solve that employers (mostly large companies) try to recruit juniors with an IT background who are trained to become seniors at an accelerated pace. Some SMEs do not attract new juniors, not to burden seniors with even more onboarding and training tasks, and those who do, are increasingly looking for staff with good general skills ('puzzlers') instead of solid IT knowledge. They are mainly looking for flexible and learnable staff, who 'fit' into the culture; display adequate communication and social-emotional skills; and can adjust and function in an open/informal working atmosphere. The study on the recruitment and retention of IT specialists in the North of the Netherlands, where this article is based on [32] reported that there are a lot of IT academies where non-IT professionals with affinity for IT are trained in short intensive tracks for a soft engineering role. In the North of the Netherlands, there were about 97 such enterprises in 2021 as centralised in Broekhuizen and Roos' [33] analysis on the digital ecosystem, and new enterprises are constantly in making. Furthermore, there is an increasing search for more diversity in terms of language, culture and distance, but we also hear doubts about whether that diversity works in practice. The world of IT is changing. While in the past an IT professional was described as a noncommunicative person absorbed in a system with low communication and social-emotional skills, nowadays, the profile of an IT professional is someone who is able to communicate and interact effectively with the client and team members [34]. These requirements and expectations may be an adjustment of the job market in order to prevent inequality due to the economic impacts of the Covid-19 Pandemic and the ever increasing incorporation of automation and technology adoption in the work fields also called "double-disruption" [35]. The World Economic Forum [11] announced that the necessary skills digital specialists need to display are ranked as: (1) problem solving skills (analytic and complex thinking, complex problem solving, critical thinking, creativity, originality and initiative, reasoning, problem solving and ideation), (2) self-management (active learning and learning strategies, resilience, stress tolerance and flexibility); (3) working with people skills (e.g. leadership and social influence); and (4) technology use and development (e.g. technology use, monitoring and control, technology design and programming).

Secondly, employers in general see 'aggressive' forms of recruitment as a problem, and there is an increasing dissatisfaction with the commercially driven recruitment which some of them labelled as 'human trafficking'. This is explained by the high costs job agencies ask for when providing an IT professional, often without offering any guarantee [36,37]. Furthermore, it was observed that competitor companies pick away staff which is felt mostly by SMEs that are limited in offering higher salaries. Employers see as solution the creating of a "carousel" system for the Northern IT labour market via which employers can transfer staff to one another in a more organic way. This idea was suggested in multiple governmental reports and pieces of advice

when formulating solutions to talent scarcity [20,38]. It seems that IT companies in the North of the Netherlands have already started implementing some of those suggestions for interviewees declared that they consciously maintain a close network to gain insights into the potential movements in the market and they promote themselves more actively (e.g. close contact with higher education institutions, participation in job markets, joint events, etc.). This trend has been used in the last years as a strategy for companies to attract young professionals, which are cheaper than more experienced professionals and seniors, and a strategy for schools to make sure they update their curricula according to the needs on the job market and ensure internship places for their students, thus a win-win situation [39,40].

Thirdly, regarding recruitment and retention of staff, employers make use of training opportunities as main approach where customization is the starting point. Large employers mainly use external trainers, and have an own learning platform/academy and monitor progress, while SMEs emphasize on a strongly informal learning-on-the-job approach and they monitor progress less systematically. Training and development is an important aspect in the IT world due to the everchanging and continuous developments and updates, and for these reasons employers invest in these training opportunities [41].

Lastly, there is a trend that employers improve the working conditions. These improvements mainly concern an increase in income (e.g. basic wages, perks, bonuses, profit distributions, shares etc.); employees are given the possibility to influence the internal decision-making process; there are experiments with co-ownership; new opportunities to increase the general well-being of staff (e.g. better thought-out onboarding processes, the use of buddies, more flexible work-life balance prospects, attractive workplaces both in the office and at home, creating the Chief Happiness Officer position). We can observe that these trends are current practices in (D)HRM [42] as instruments and tools that increase motivation and involvement of staff members and ultimately to secure employee retention and loyalty [37,43]. These aspects are also supported by the Self Determination Theory of Motivation [44] which has been heavily used in organisations in the last decennia. Analysing the interviewees we noticed that the elements of this theory are present in the talent management good practices used in companies. Employees are given *autonomy*, meaning being in control of their activities and lives (e.g. decide their working hours, have a say into their career developmental needs and are partners in management decision process etc.); *relatedness and belongingness* is practised, meaning there is a close, cooperative, respectful, collegial atmosphere at work that foster positive relationships and they feel they belong; lastly their need for *competence* is satisfied by investing in improving their mastery and skills (e.g. trainings, courses, mentoring and coaching, well-being, work-life balance, etc.). Studies report that when these three elements (i.e. autonomy, relatedness and competence) are incorporated in the leadership style employee volition, motivation and engagement are fostered which will eventually result in enhanced performance, persistence, creativity loyalty and ultimately higher talent retention [28,45,46].

5. Limitations and some directions for further research

This study was not without limitations. Due to the complexity of the topic, time frame and methods used, there were certain limitations that should be addressed in future studies.

Firstly, a qualitative design was used making use of semi-structured interviews because of the complexity of the issue investigated. For further replications we recommend an improved design (e.g., mixed methods: in-depth interviews and a survey) which may balance out the limitations of each method, provide stronger evidence and more robust outcomes [47]. Secondly, although a saturation point was reached, the outcomes of this study may not be generalised to other countries and even other regions of the Netherlands. It may be the case that these aspects of recruitment and retention of IT specialists may present other facets in other regions of the Netherlands and other countries. Therefore,

future replications should consider at least a comparison of the data collected in different regions of the Netherlands. Thirdly, another limitation of the study was the very dimensions we focused on: recruitment and retention of IT professionals and IT talent scarcity. In order to get a deeper understanding of this phenomenon and how employers deal with the challenges and effects of it, we recommend that in future replications factors as culture, inclusion, internationalisation/globalization, cultural obstacles in establishing cross-cultural collaborations, diversity, female underrepresentation in IT, the recommended leadership style that could be used, opportunities and limitations of re-professionalisation, looking for talent in the inactive working layers of the society [13] should be included because they might also explain this complex issue. Lastly, operationalising a qualitative design making use of semi-structured in-depth interviews during the Covid-19 Pandemic was not ideal. As a result, all interviews were performed online via Teams. Although the interviews were extensive and reach data was gathered, the non-communication aspects of interviewing were missed and also the personal contact and visit at the companies, which might have generated more insights regarding the atmosphere at the company for example. Therefore, in future studies, it would be ideal to perform the interviews face-to-face.

CRedit authorship contribution statement

T. Ciff: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **A.E. Brouwer:** Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **A. Ponsioen:** Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Visualization. **H. Van Lieshout:** Conceptualization, Funding acquisition, Methodology, Project administration, Resources, Supervision, Validation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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