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Remote communities & resource-based industries

Fact sheet

Demographic Foresight Modelling as a strategic planning tool for local authorities

The **REGINA** project on regional Innovation in the Nordic Arctic and Scotland focuses on sparsely populated remote regions with large-scale industries. **REGINA** has developed a framework for working with local smart specialization strategies when a community is faced with major new developments or socioeconomic changes. A set of tools have been devised that can be used to better analyze and plan for such changes and developments. This fact sheet presents a demographic and labour market foresight model as a strategic planning tool for municipalities.

What is the Demographic Foresight Model (DFM)?

The DFM is a simple spreadsheet approach to population projections, adapted to apply specifically to smaller populations. It produces projections at five-yearly intervals between 2015 and 2050 and is designed to explore the longer-term cumulative impacts of "employment shocks" caused by inward investment or disinvestment.

What is the advantage of a DFM over local or regional projections produced by a national statistical agency?

Even if projections are available for your local area (and this is not the case in some parts of the Northern Periphery and Arctic), the DFM has the advantage of giving local staff the flexibility to explore the implications of different assumptions about the future.

What kind of data input is required?

The model requires population data for the base year, in five-year age groups, split by gender. It also requires fertility and mortality rates for the wider region or the country as a whole. Migration rates are also required, for the local authority itself if possible. Finally, assumptions need to be made about rates of change in fertility, mortality and migration.

What kind of outputs can be generated?

The DFM produces population projections from 2015 to 2050, split into five-year cohorts and split by gender. However, most users will access the results through a graphical "dashboard" (see figure 1).

What kind of expertise is required?

The DFM is intended to be used by non-specialist staff, such as those working in the planning or the economic development department of a local authority.

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Lead Partner: Nordregio

Partners: Alstahaug Municipality, BioForsk, Brønnøy Municipality, Kommune Kujalleq, Midtskandia Norway, Midtskandia Sweden, Nordland Research Institute, North Highland College, Sodankylä Municipality, Storuman Municipality, University of Lapland

Associated Partners: Highland and Islands Enterprise, Nordlands Fylkekommune, Nordic Council of Ministers

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Why is the DFM a useful tool for local authorities?

The DFM allows local authority staff to undertake a systematic and tailored assessment of how its population is likely to change. This is crucial intelligence for the planning of appropriate future services, and for strategic support for economic activity. More specifically, the DFM is designed to help them to assess the medium- to long-term demographic impact of proposed inward investment or disinvestment. Will a particular investment ameliorate the age and gender imbalances? Or could it store up problems for the future? While many locals may have intuitive answers to these questions, the DFM brings us a bit closer to objective evidence.

Can the DFM answer all my questions?

Of course not! It needs to be complemented by a range of qualitative evidence-gathering methods, which are briefly reviewed at the end of this document.

How does the DFM calculate projections?

First, the baseline population data and fertility, mortality and migration rates are entered. These are used as the basis for the projected population for the next five-year period. The sequence of calculations is as follows:

1. The number of births during the next five years is estimated.
2. Each five-year cohort of the population is aged by five years.
3. All cohorts are adjusted for mortality.
4. Estimated numbers of in-migrants and out-migrants are added and subtracted from each age group.
5. The sequence is repeated to generate the population distribution for the third time-period, and so on.

PHOTO: LENEISJA LJUNGSBERG

The DFM dashboard

All the results of the modelling are simultaneously displayed in a series of graphs that form a "dashboard" (figure 1). The graphs show how the total population, age structures, dependency rates and gender ratios are likely to change over the next 50 years.

It also shows what level of net migration would be required in order to stabilise the population at current levels (the Equilibrium Migration Requirement).

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Demographic Foresight Model
Final Version 11/10/2017

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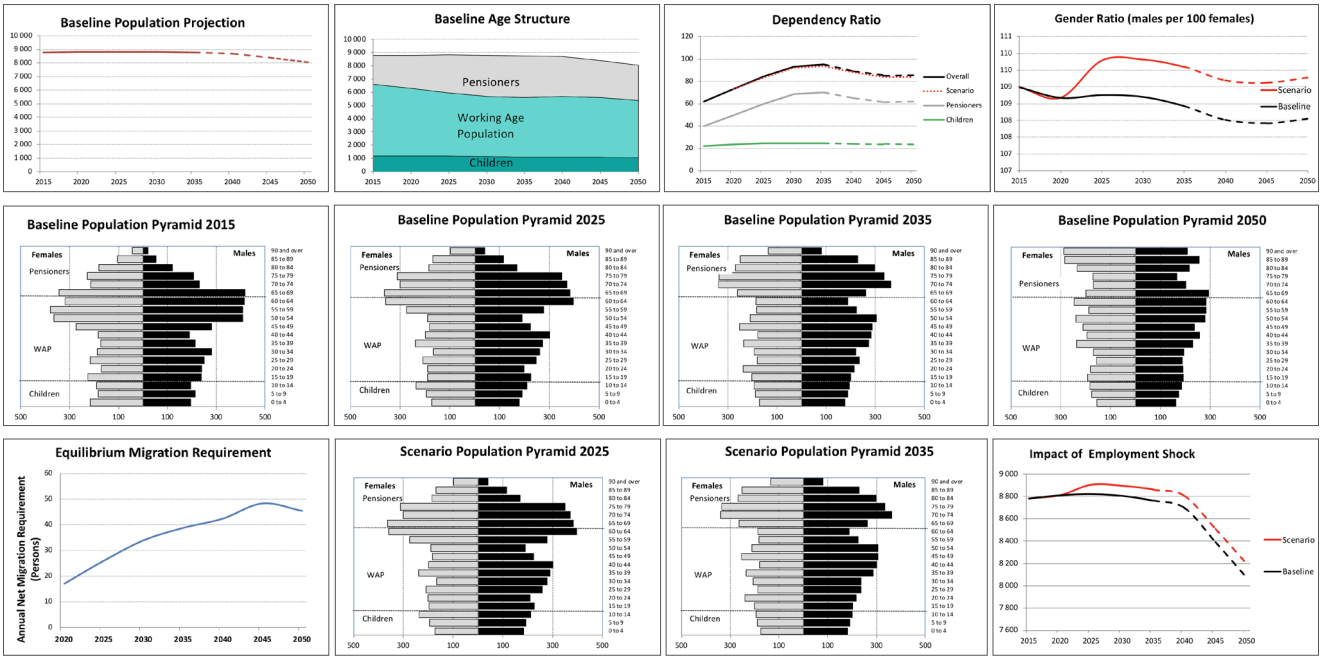

Figure 1: *The DFM Dashboard for Sodankylä Municipality in Northern Finland.*

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Main findings from the local authorities in the REGINA project

For Sodankylä in Finland and Storuman in Sweden, the analysis reveals some challenging age structure and a shrinking working age population. This also leads to an expected increase in the demographic dependency rate.

The gender ratio in Sodankylä illustrates that for every 100 women there are currently about 109 men, and that this situation will remain static in the coming decades.

For Storuman in Sweden, the gender ratio is 103 men for every 100 women and this will change slightly, with about 102 men for every 100 women in 2035.

Brønnøy in Norway seems to be have a less "top-heavy" age structure compared to Sodankylä and Storuman. Dependency rates are, in consequence, relatively lower but they will rise slowly towards 2040.

Unlike Sodankylä and Storuman, the gender ratio in Brønnøy is skewed towards women, with only 97 males for every 100 females in 2015. By 2040, this is forecast to rise to an estimated 99 males for every 100 females.

See more info on these figures at **www.reginaproject.eu**

What about "employment shock" scenarios?

Sparsely populated areas with relatively small numbers of residents sometimes face a challenge from corporations who wish to develop large-scale operations to exploit the area's natural resources. Conversely, some local authorities with existing large employers, such as mines, may face the consequences of closure.

Both of these kinds of "employment shock" will have an impact upon the local population structure. Workers who move in or out of the area will bring or take family members with them. Furthermore, the consequences will not just be the one-off effects of in- or out-migration. There will usually be a more lasting impact upon age structure, fertility and mortality.

The DFM is designed to take account of these lingering effects by incorporating migrants into its calculations and re-estimating the projections for the post-shock periods. The results are shown in the graphs at the bottom of the dashboard.

To specify the scenarios, it is necessary to have good information about the number of jobs to be created or lost. Age and gender will be particularly important in defining the size of the "indirect migration effect" (the number of family members who arrive or depart with the employees).

Migration assumptions: The importance of consultation

The value of the DFM as a strategic planning tool lies in the fact that it provides a space where local authority staff can explore the implications of different assumptions about future migration trends. This is the case not only for those changes associated with major inward investment but also for more gradual changes that might take place due to cultural and technological shifts. What, for example, might be the implications of opportunities for e-business, or the increasing popularity of wilderness leisure and tourism? On the other hand, it might be interesting to speculate about retirement migration, and the effects of centralisation, in major centres, of certain key services upon which elderly people depend. The longer term cumulative effects of these could be explored by making careful assumptions about migration, distinguishing different age groups.

All the parameters of future migration assumptions that are entered into the model are inevitably speculative – after all, none of us can know what will happen in the future. However, we can achieve greater confidence in the assumptions being made and the outputs of the model, by consulting members of the local community.

In the case of employment shock scenarios, it is obviously important to take account of the views of the companies concerned, and other industry insiders.

In the case of scenarios in which change is more gradual, it is helpful to take account of the views of well-informed individuals, such as those managing local services, business people, tourism promoters, and so on.

This highlights the fact that, while the DFM is an extremely useful tool for exploring future demographic trends, it should not be used in isolation. Rather, it should be used in concert with a range of other qualitative approaches.

PHOTO:SHUTTERSTOCK

Complementary approaches to exploring local demographic and labour market issues

To support the DFM model with evidence, qualitative methods can provide information about perceptions and behavioural patterns among residents in the local area.

The benefit of using qualitative approaches is that they can help us to understand the characteristics and motives of migrants. Thus, a qualitative study can explain factors influencing people's mobility and lifestyle choices.

Of course, whereas a quantitative approach analyses numbers, a qualitative approach focuses on words and text. This could involve recordings or transcripts from semi-structured thematic interviews, participatory observations, workshops or focus groups, or written stories focusing on, for example, the main reasons for staying in or leaving a particular location.

Semi-structured interviews can also be useful when piloting a questionnaire to make sure all relevant aspects for local habitants are included.

▶ Employment shock scenario's impact in Sodankylä

In Sodankylä, the shock scenario assumes the creation of 500 jobs from mining activities in the period 2030–2034, which would lead to a population of 9,226 in 2035; this is 464 more people than the baseline scenario of 8,762 persons.

One assumption in this employment shock scenario is that many of the jobs are likely to be filled by workers from neighbouring areas. The University of Lapland carried out a qualitative analysis based on semi-structured interviews with mining workers who currently commute, to try to understand the most important factors influencing decisions about whether to commute to work or move closer to the workplace.

As most people who choose to move for a new job in the mining sector are of working age, the dependency ratio would improve. But as these jobs are predicted to be more popular among men, the gender ratio will be skewed further with 115 men for every 100 women.

▶ Employment shock scenario's impact in Storuman

In Storuman the shock scenario assumes the opening of a new mine, leading to an increase of 130 jobs between 2020 and 2024. This would result in a population of 5,446 by 2035. This is 145 more than the baseline scenario, in which 5,301 people live in the area. The dependency ratio would also initially decrease. However, the gender ratio would be more skewed, with approximately 107 men for every 100 women.

One assumption in this employment shock scenario is that around 50% of the workforce will be people immigrating and settling in the area and 50% either by people commuting from surrounding areas or by people in the existing local workforce.

Attracting women to the local labour market has been a focus for Storuman. Project leader Karina Umander conducted qualitative interviews with women working in traditionally male-dominated industries to get an understanding of why they worked there, what attracted them to pursue work in this area and whether they would recommend it to other women. These perspectives provided input on key factors such as how education, work environment and local culture might successfully include female workers in the local labour market.

Evidence-based model building

The use of complementary qualitative methods supports the building of an evidence-based DFM model to assess assumptions about the future, such as migration patterns, the male-female ratio, birth rates or employment increases in a shock scenario.

It is also helpful to include qualitative explanations for the various assumptions and associated processes of change. This helps readers to understand the underlying reasons and beliefs behind the observed statistics.

To sum up; a combination of quantitative and qualitative methods provides a solid foundation to develop evidence-based policy to support planning in the field of local demography and labour market issues.

For more information, please go to **www.reginaproject.eu**

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