Authors

Merih Kunur
Merih Kunur is an experienced vehicle designer, researcher and consultant. He studied Industrial Design at Mimar Sinan University, Istanbul, from 1981-7, focusing on transport projects. He later graduated in 2003 from the Vehicle Design Department at the Royal College of Art with an MPhil, his thesis investigating mobility issues within London. Since then Merih has worked with the Helen Hamlyn Centre on the Mobility project, in collaboration with Capoco Design, and currently on a study of the future ambulance. Previous projects include animation, art direction for TV, retail, textile and vehicle design. He has exhibited in Turkey, the UK, Japan and USA. In 2006 his work was exhibited at the Detroit Motor Show and at Ambex in Harrogate.
merih.kunur@rca.ac.uk

Rama Gheerawo
A designer and academic by training, Rama joined the Royal College of Art Helen Hamlyn Centre at its inception in 1999. He is leader of the Centre's Research Associates programme focusing on 'innovation through inclusive design' and looking at how user-centred design methods and practices can create new knowledge and new opportunities for business. The programme has delivered creative thinking to over 65 partners, many of which are household names. His key interests address more inclusive modes of transport and independent living. He has a special interest in moving inclusive design beyond its current construct of age and disability to address ideas of social, racial, cultural and technological exclusion.
rama.gheerawo@rca.ac.uk

Densely populated cities can support good transport infrastructure. But in sparsely populated rural areas, options can be significantly reduced and rural communities face a serious loss of mobility. For older people in particular, this can have an adverse effect on being independent and can leave them cut them off from public services and isolated from family and friends.

This publication explores the implications for digital service providers of supporting greater mobility and independence for older people in rural areas.

Merih Kunur and Rama Gheerawo

Royal College of Art

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Merih Kunur and Rama Gheerawo

contents

Foreword

Eric Dishman, General Manager and Global Director, Product Research and Incubation, Digital Health Group, Intel

The Digital Health Group at Intel is committed to tackling the challenge and opportunities of an ageing population and struggling healthcare systems. Central to our efforts is the conviction that people should be enabled to 'age in place' – a place or environment of their own choosing. All the evidence points to the fact that quality of care, life experiences and health outcomes are better when people have that choice.

The Connections project is an example of our approach to ageing. Our research with over 1000 households in 20 countries has demonstrated to us the fundamental importance of mobility to the attainment by older people of autonomous and independent lives. The work conducted by RCA students and research associate Merih Kunur provides a clear and powerful illustration of how mobility impacts on independence, inter-generational contact, life in the community and identity. It also points the way towards how we design and innovate with this in mind.

We recognise that achieving 'ageing in place' is not simply a matter of technological enablement. Alongside the development of appropriate technologies, sensitive to older people's needs and designed with them and their communities of care in mind, we need to focus on transforming models of care. However, our belief is that technology will play a central role in enabling the transformations in the way we provide care that are required.

We believe that success in achieving our goals for ageing populations will depend on a collaborative effort. Our work with the Royal College of Art and the Helen Hamlyn Centre is an illustration of our commitment to working with researchers, designers and innovators worldwide to think through the issues and work toward the right solutions.
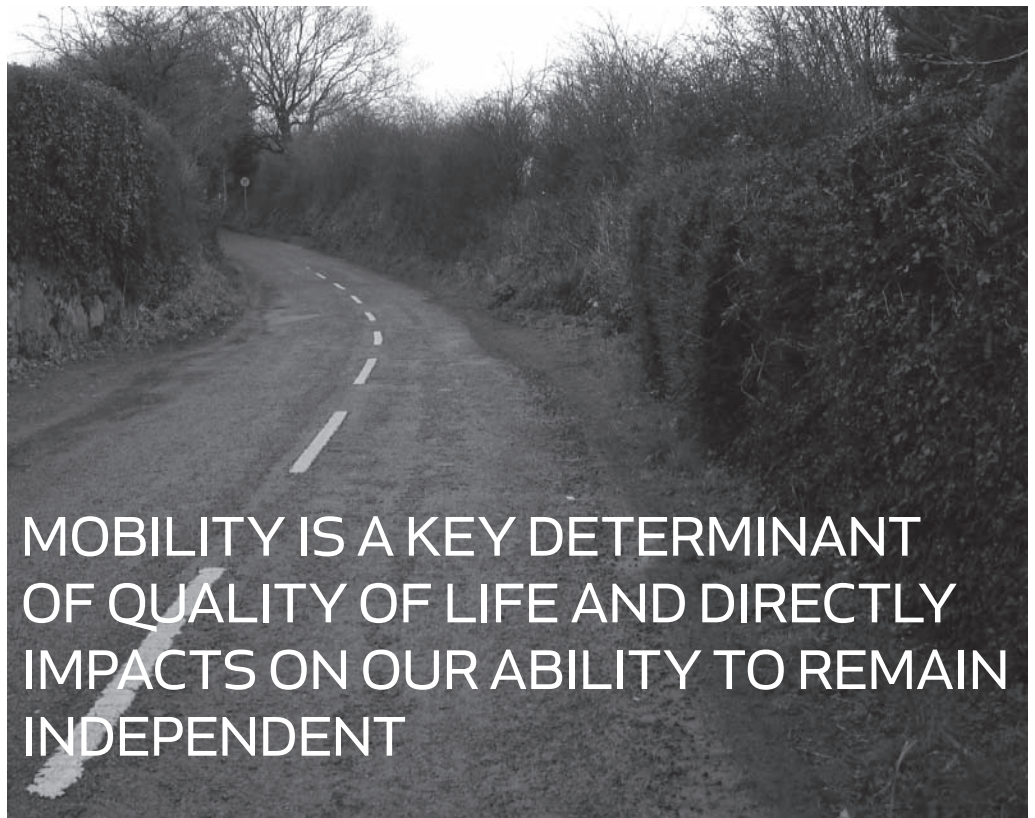
MOBILITY IS A KEY DETERMINANT OF QUALITY OF LIFE AND DIRECTLY IMPACTS ON OUR ABILITY TO REMAIN INDEPENDENT

Introduction

Simon Roberts,

EMEA Ethnographic Research Manager, Product Research
and Incubation, Digital Health Group, Intel

Our greater sense of mobility is a major theme of modern times.

From the handsets in our pockets to the increased ability to own cars or take cheap flights, we are living in world of the hyper-mobile. And yet we spare little thought for the time when, inevitably, as we age we will be less mobile. Less mobile physically, or unable to drive a car, we will become reliant on others to interact beyond the home. As the world ages the need to rethink how we provide transportation for older people becomes urgent. This report is a contribution to this debate.

In a very real sense transportation is the ultimate platform for independent living. It enables access to a wide range of basic services (shops, post offices and healthcare), it links people to important spaces (such as community centres and day care) and contexts beyond the home (population centres and healthcare settings) which are central to successful ageing in place.

Transport, by linking people to places and people to people, creates connections. Connections are key to ageing in place, where we think about place as something more than just the four walls of the home, but the wider community setting in which individuals have histories, relationships and the need to access the basic necessities and facilities of everyday life.

Transportation and mobility in late life is important since it creates two distinct health outcomes. Mobility in many ways is synonymous with sociability. So the first positive outcome of transportation is social health – an ability to maintain and create relationships and interactions with people beyond the home. And it is well understood that people with healthy social networks have better physical and mental health profiles than those who do not. A second, more obvious health outcome is that transportation is vital for people to visit doctors, pharmacies and attend hospital appointments.

So enhanced mobility for older people has direct and indirect health benefits. But the voices of older people themselves testify to the fact that being mobile in late life creates enjoyment, opportunity and community. This report describes different aspects of mobility in later life and the challenges and opportunities in sustaining mobility as we age. •

Mobile Thinking

Dale Harrow,
Head of Vehicle Design, Royal College of Art

With age, all of us change physically, mentally and psychologically.

This can involve impairments in eyesight, hearing, dexterity and memory, all of which have significant implications for the design of the systems, services and vehicles that can help us to remain mobile for longer and so feel more connected to the world around us. The Vehicle Design Department at the Royal College of Art seeks to reflect changing attitudes to mobility and transport and set new agendas to be addressed. In particular the rural/urban divide becomes a key issue to approach through design.

The Vehicle Design Department has addressed a number of such issues in recent years, often in partnership with the Helen Hamlyn Centre. Accordingly our emphasis has broadened from concentrating on automotive styling to considering much wider transport and social questions, including how to increase mobility –and therefore independence – for older people.

A key platform for this collaboration is the Helen Hamlyn Research Associates programme which matches new RCA graduates with partners in industry in order to undertake design research projects related to social and demographic change.

In recent years these innovation projects have ranged from studies about rethinking dashboard information and in-car lighting, to future-scenario exercises that explore driverless intelligent vehicle systems and hybrid public-private services. Research partners have included Ford, Optare, Visteon, the Design Council and Capoco Design.

This particular project, undertaken with Intel, investigates rural mobility for older people. Students in the Vehicle Design Department have worked closely with research associate Merih Kunur to determine and visualise different aspects of the research thinking. The presence of a prestigious industry partner committed to user research reinforces a consultative approach that considers not just older drivers but also the disabled and other groups for whom transport accessibility is closely allied to independence and quality of life.

The Vehicle Design Department, through projects like this one and with enlightened partners like Intel, seeks to play a pioneering part in making sure that increased independence and improved quality of life are ideals that will soon become realities. •
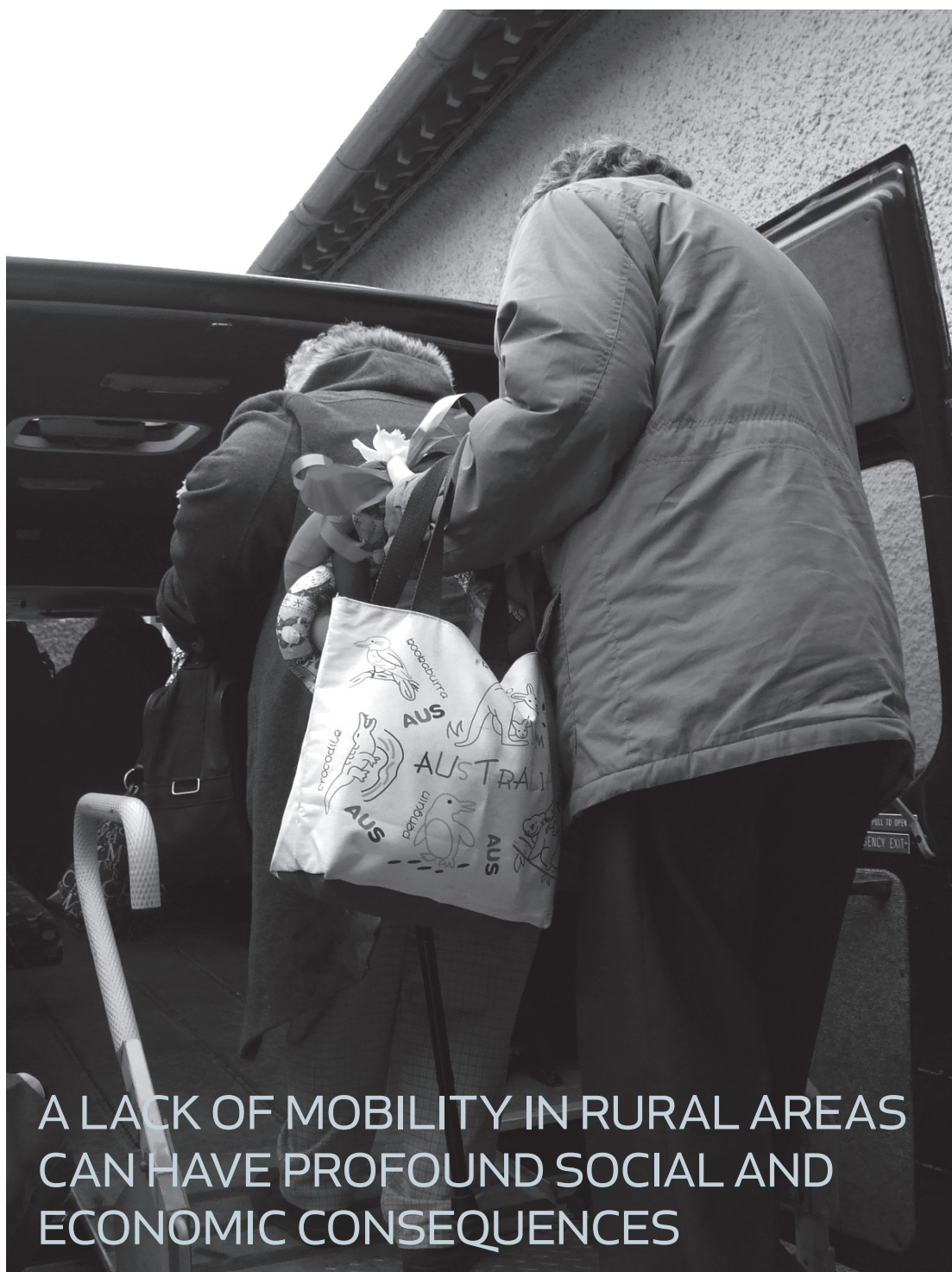
A LACK OF MOBILITY IN RURAL AREAS CAN HAVE PROFOUND SOCIAL AND ECONOMIC CONSEQUENCES

Approach

The study explores the implications for digital service providers of developing enhanced access to mobility for older people in rural areas. In order to explore the relationship between transportation/mobility and 'social health' it has focused on assessing relevant needs and possible answers in the context of the British Isles.

There is little doubt that a lack of mobility for older people in such areas can have profound social and economic consequences. Densely populated cities may be able to support multi-modal transport infrastructures, but in sparsely-populated rural areas significantly reduced transport options can mean that whole communities suffer a loss of mobility. For older people in particular, a lack of transport may result in cutting them off from public services and isolating them from friends, family and much else.

Even where transportation does exist in rural areas, older people may face a range of related problems that include boarding and disembarking buses and trains, poor journey links and worries about personal safety.

The study identifies four key themes derived from its subject: independence, identity, inter-generation and integration. Independence looks at enhancing personal self-reliance through the improved operation of services and infrastructure. Identity investigates how the strengthening of a whole community's character can impact upon the personal sense of identity of its constituent individuals. Inter-generation looks at how mobility might encourage positive interaction across the age groups. Integration proposes how transport might be made to mesh with other services, for example healthcare.

Each theme is illustrated with design concepts from the Vehicle Design student teams that visualise scenarios for change; implications for digital service providers are included at the end of each theme section. Overall the project is informed with a spirit of creative inquiry that aims to stimulate further positive investigation rather than propose specific answers. •

Research Methodology

top: Older people interviewed in rural Ireland

left: Third Age Foundation facilities in Summerhill, Ireland. The foundation runs an active retirement group, founded in 2001. They promote independent living for older people in rural areas and support life-long learning

opposite page: Vehicle Design students using public transport in Dublin

The research context and outcomes were directed by Helen Hamlyn Research Associate Merih Kunur working with design scenarios generated by first-year Vehicle Design Masters students at the Royal College of Art.

The project firstly examined existing research papers and reports to establish a context. Students were divided into five teams, each working on a different strand of the project. Initially desk research and field studies were combined to direct the design thinking. Regular critiques with the Vehicle Design Department tutors and the Helen Hamlyn Centre served to assess material relating to both vehicle design and inclusive design.
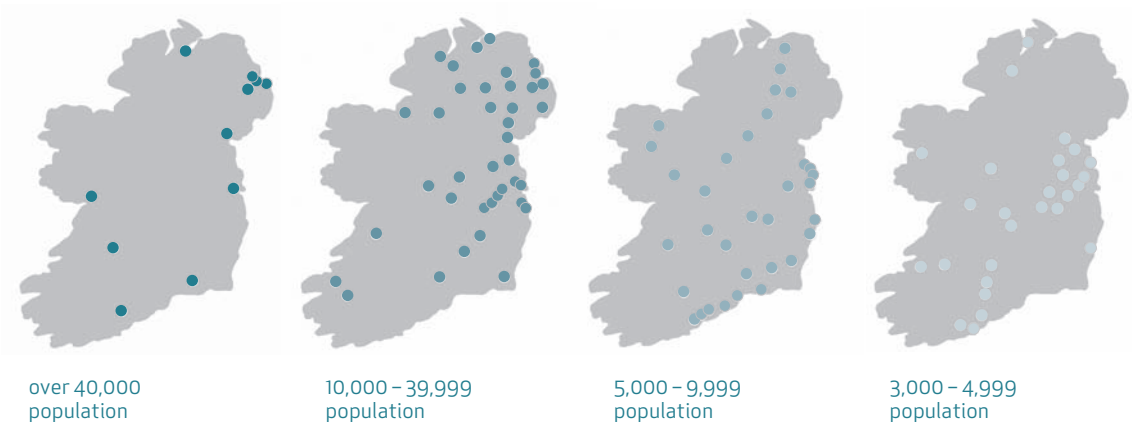
A central part of the research was a field trip to rural Ireland to learn about the problems older people face. There researchers and students made journeys by public transport and local community bus services in order to understand the existing shortcomings in the physical transport infrastructure. Interviews with older people helped identify their needs and aspirations and so revealed various underlying issues relating to social and economic mobility.

The field research began in the rural northeast part of the country and continued with a coach journey made from Dublin to investigate various aspects of urban-rural connectivity. The conditions of roads and traffic, roadside walkways and bus stops were recorded and photographed.

Formal interviews were conducted with the Third Age Centre, an active retirement group in Summerhill, County Meath, which runs a series of services for older people including an internet café, an outreach advocacy service,

| over 40,000 population | 10,000 – 39,999 population | 5,000 – 9,999 population | 3,000 – 4,999 population |

above: Population distribution across Ireland showing an emphasis on people living in smaller towns and villages rather than larger cities. *(Source: The National Spatial Strategy 2002-2020)*

left: Flexibus interior with wheelchair access at the back. Driver assists entry for disabled passengers

bottom left: Flexibus provides a door-to-door transport service for older people

opposite page: Capturing the movement of the group through rural Ireland by using GPS trackers provided by Intel. Key locations were: 1. Dublin; 2. Trim, County Meath; 3. Summerhill, County Meath

day trips and social events. These interviews uncovered various issues to do with healthcare, mobility and changing travel habits among older people.

The final field research stage involved observing a local bus service for older people who would be picked up from a community event and taken back to their homes in surrounding villages. Interviews on the bus revealed many of the benefits and shortcomings of the existing transport situation.

The user research revealed opportunities for clear design intervention that would inspire the design solutions subsequently proposed. These were curated into the four themes that follow and which together build a picture of rural mobility needs. •
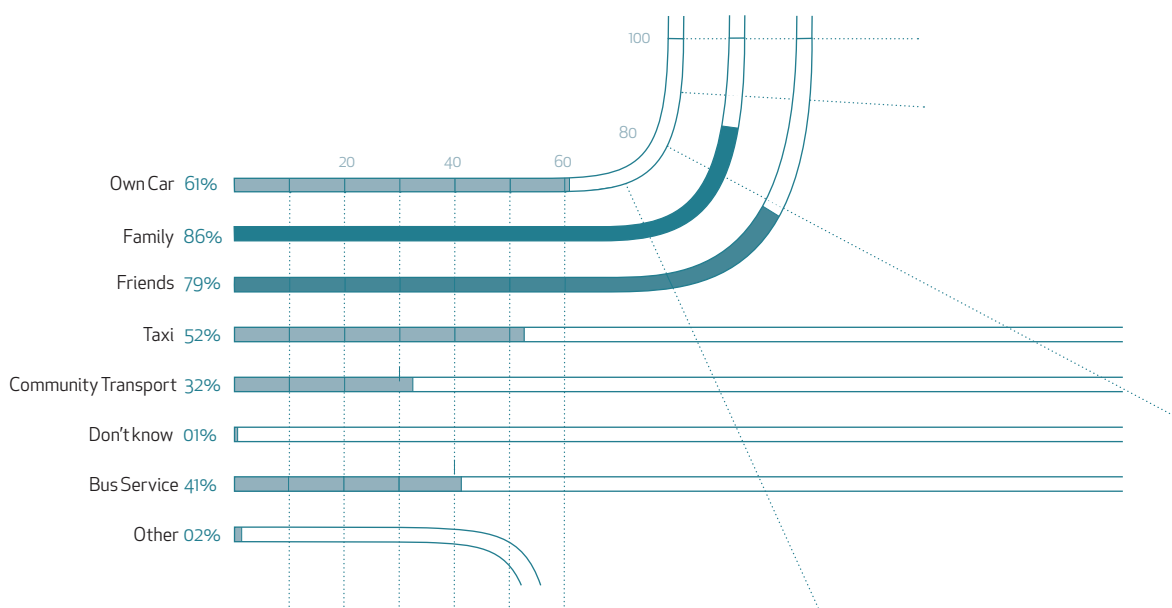
A FIELD TRIP TO RURAL IRELAND HELPED DESIGNERS LEARN ABOUT THE PROBLEMS OLDER PEOPLE FACE

01
Independence

Independence, as described here, connotes an 'independent quality of life' in circumstances where older people may experience a loss of personal autonomy due to a variety of external factors.

above: How older people travel in rural areas
(source: Rural community network RCN, Ageing and rural poverty Northern Ireland, 2004)

In retirement, many people move from urban areas to the country where they may well find that their idyllic retreat is ill-served by transport options, thereby reducing their sense of freedom and independence. Because personal mobility is such a key element in maintaining an independent quality of life, this theme explores 'independence' by considering some relevant mobility issues.

Independent living in later life is influenced by three main factors: physical and mental well-being; social life; and level of income. These factors are, in turn, shaped by life experiences such as education and work history.

Other characteristics such as age, gender, relationship status and area of residence also contribute to determining life circumstance and impact on personal independence. According to a study carried out in Georgia, USA (Ball et al, 2004), older residents in assisted-living situations still retained a strong desire for independence. This went beyond just performing the everyday activities of daily living to the aspiration of perceiving themselves as being independent. Equally important was finding satisfaction in using their capabilities rather than focusing on the limiting factors of old age. This is true for the majority of older people, not just those living in care homes. It is therefore important for those who shape the relevant environment to take into account not just the realities of declining sensory, physical and cognitive capabilities in older people, but also their positive aspirations.

If 'feeling independent' plays an important role in determining quality of life, and if mobility is a key contributor to that sense of independence, it is logical to look to the remote rural environments that often attract retired people and where transport services can be scarce or intermittent.

A UK-based research project on transport and aging (Gilhooly et al, 2003) focused on improving the quality of life for older people via public and private transport. That project suggests significant links between quality of life and car ownership and access to transport. Banister and Bowling's (2004) research in this field showed that access to a car improved perceptions of quality of life and that people with such access were more likely to participate consistently in social activities, especially those outside their homes.

A Canadian study found that whilst transport dependence did not itself detract from subjectively experienced 'valuation of life', personal well-being was still negatively affected when mobility and transport needs were not met (Cvitkovich and Wister 2001). This was reinforced by the present project in Ireland where it was found that when older people no longer have access to a car or cannot drive, this negatively impacts on their wellbeing. A comparative U.S. study concluded that ceasing

to drive was among the strongest predictors of depressive symptoms in older people (quoted by Metz 2000: 149). Rothe (1994: 76) also saw the loss of a driver's licence as a 'major stressful life event'. Most definitions of mobility entail measurements of the ability to access other people and places (Metz 2000) and access to a private car is seen as a way of doing this conveniently, safely and immediately. The private car offers a truly independent option for mobility, and by looking at what it offers (and why older people miss it as a mode of transport when they no longer drive), we find some key determinants of any good mobility infrastructure. These determinants include a 'door-to-door' service; convenience and availability that are not linked to time of day or weather; personal space; and, most importantly, independence.

Shared access to hybrid forms of private transport also becomes important in rural areas, with schemes such as car sharing and community transport services providing some of the door-to-door convenience of a single occupancy vehicle along with some of the social and sustainable benefits of mass transit.

There are, of course, practical benefits of physical mobility such as obtaining goods and services or accessing healthcare, but a good mobility framework and infrastructure also confers the psychological benefits of 'getting out and about' and involvement with a variety of other communities. Many older users who were interviewed for the project went shopping not just to buy groceries but also for the social interaction. Their use of transportation was very strongly driven by a desire to remain socially active.

Metz (2000) put forward the concept of 'potential travel'—that is to say the 'potential to make trips that are not actually made'. Such prospective trips might include travel at short notice to respond to family emergencies, or journeys 'on a whim' simply for pleasure or aesthetic enjoyment. Having the 'potential' and the choice to be more mobile is an important part of feeling and being independent, something that becomes very valuable to older people who will spend long periods at home.

Maintaining independent mobility can also be a matter of life and death. In Britain, people over 65 make up the largest single group of patients using NHS hospitals, accounting for 40% of all emergency admissions. Older people worry about the prospect of deteriorating health and can become anxious that they may not be able to access the care they need when they move from urban to rural settings.

Leinbach and Watkins make a distinction between journeys intended for 'life maintenance' (e.g. shopping, medical, financial) and those for 'higher order' activities (e.g. social, religious, eating out). Evidence suggests that mobility patterns among older people show great variety across these reasons for travel. According to the MOBILATE project, the most common reasons for leaving the house were: shopping (31%); meeting friends and relatives (21%); and strolling/walking (11%) (Taken & van Lamoen, 2005). Similar findings emerged from a 2002 survey by the Department of Transport in which older people's most popular reasons for travel were food shopping, going to the post office and visiting family and friends (Banister

# DIGITAL CONNECTIVITY HELPS OLDER PEOPLE TO REMAIN INDEPENDENT

& Bowling, 2004). Travel for medical attention, although it might not be frequently undertaken, is nevertheless deemed one of the most important reasons for making a journey and good emergency health access should be part of any good infrastructure.

However disparate these activities might be, all take place locally. Forty-four percent of trips across the country were found to occur within 1 km of home with a further 24% within a radius of between 1 and 3 km. Only 14% were over 10 km. This range was even smaller for people in rural areas where half the journeys were within 1 km of home. Older people were found to be inclined to indulge in activities closer to their home (Taken & van Lamoen, 2005).
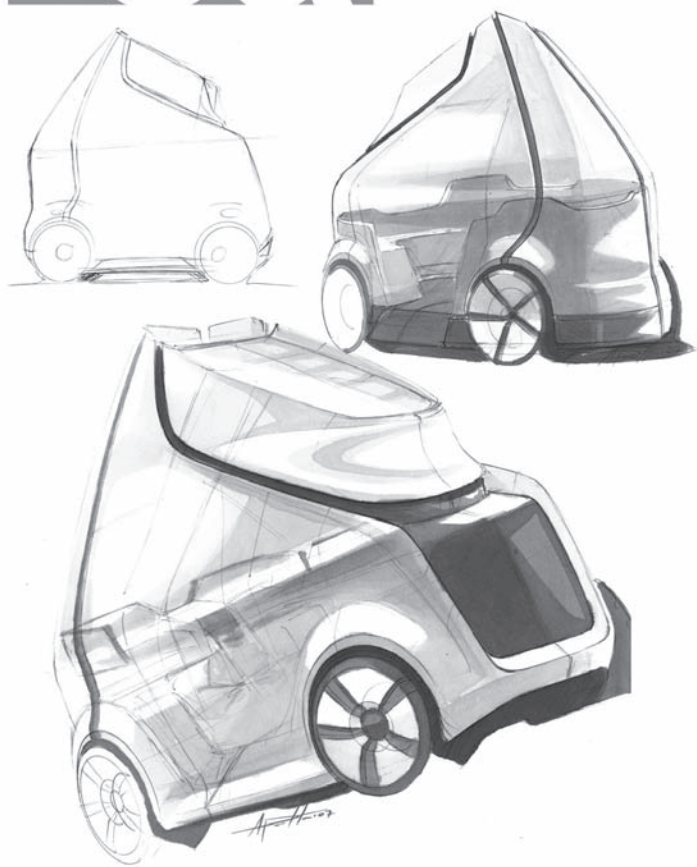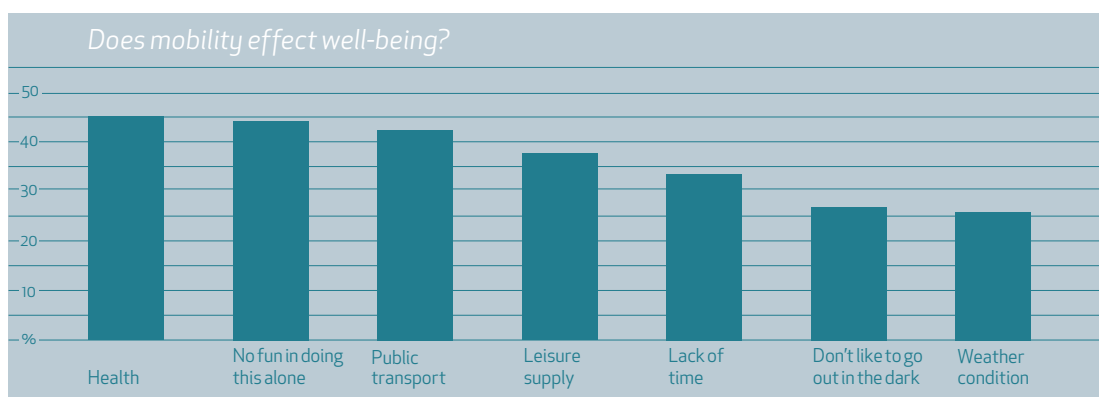

left: i-car project by Reg Kingston, Raquel Lopez and Arturo Peralta. Driverless vehicle combines the benefits of public and private transport options creating greater choice and independence for older people

opposite page: Different reasons people do not want to travel, consequently impacting their well-being (source: Joachim Scheiner, Department of Transport Planning, University Dortmund)

ARTURO PERALTA

Does mobility effect well-being?

[Bar chart showing values for the following categories, with a vertical axis from % to 50:]

- Health: ~45
- No fun in doing this alone: ~44
- Public transport: ~42
- Leisure supply: ~38
- Lack of time: ~35
- Don't like to go out in the dark: ~26
- Weather condition: ~25

Designing for Independence

The private car provides transportation whilst maintaining autonomy and self-esteem. However, in Ireland many people rely on public transport and older people become less likely to use a car as their capabilities reduce. Rural public transport can be scarce and does not provide the 'door-to-door' convenience of the car. Older people make gradual changes to their travel habits over the years in response to their changing needs and capabilities (Burkhardt, 1998; Marottoli et al., 1993), so infrastructure should make allowances for this.

The 'i-car' vehicle concepts developed by Reg Kingston, Raquel Lopez and Arturo Peralta address such issues by creating an autonomous vehicle system. The unit can be remotely called to pick up and deliver people 'door-to-door' and interface with digital services to be ordered from home, website or mobile device. It works at a local scale in rural settings and can interface with other 'long haul' modes of transport such as the bus or train. This concept provides an improved level of independence for older people by combining the benefits of private mobility and public transport and increasing their opportunity for 'potential' travel.

Two more RCA Vehicle Design projects illustrate benefits. 'Flow' by Sergio da Silva, Junwoo Jeong and Ilaria Sacco looked at how dependency and immobility can lead to social exclusion and deteriorating health. The resulting designs encourage older people to connect socially as they travel; by using a 'living room' layout strategically to engender inter-familial communication.

'Sharing' by Jung Hoon, Paul Howse and Pierre Sabas designed a range of village-based and village-owned vehicles to maintain localised independence by taking residents to local shops and facilities. They ranged from a single seater for easy access to longer distance vehicles with greater passenger capacity for journeys to neighbouring towns and villages.

A Helen Hamlyn Research Associate project with Ford conducted by Shaun Hutchinson in 2001 looked at maintaining independence in urban and suburban areas by creating a range of shared ownership vehicles and associated services that relied on digital technology to support and enable. (www.hhc.rca.ac.uk/archive/hhrc/programmes/ra/2001/shaun.html) •

Implications

The outcomes of this theme have various implications as follows:

1. Mobility is not just about transport. It is about enabling social connection and creating personal independence.

2. Personal independence for older people is influenced by more than their physical or sensory capabilities. It includes their lifestyle choices and experiences. Most importantly, it is also about their individual aspirations as these do not diminish with age.

3. Although older people seek to maintain their independence, they will be part of a family or community so any solutions should address this reality tactfully. Personal independence should be complemented by access to a social network.

4. Mobility solutions should be closely linked to the social interactions an older person aspires to make in order to improve well being.

5. Solutions do not have to span the country or cross continents. Localised solutions can have an equally positive impact and should be seen as essential.

6.   Digital services that encourage independence for older people should bend to suit their lifestyle, not the other way around. Mobility services should support 'potential travel' and focus on a 'door-to-door' solution.

7.   Links should be developed with institutions, charities, local authorities and other parties involved in improving independent mobility to further develop services, devices and extend functionality. Examples include a 'home-to-hospital service' that could take an older person from living room to doctor's surgery for check ups or emergencies, and a subsidised, on-demand, local transport service that takes people from doorstep to destination.

8.   Digital services should link what is happening in the home with outside the home. Digital infrastructure in the home could be used to access services and communities, and to enable mobility and independence.

02
Identity

A cohesive, vibrant community can only be sustained when the individuals who make up that community identify with the goals, aims and needs of the majority. Mobility plays an important role in strengthening and developing a community by maintaining good connections between its individual members.

The Identity theme looks at the relationship between individual identity and community identity, discussing how both can be developed better to support rural living. This process can be undertaken through channels like community activities and events, public access libraries, arts programmes, community learning, local development and economic improvement. Good accessibility and enhanced mobility allow greater opportunities for individuals to link with the wider community, so allowing them to maintain a greater sense of identity based on the local area.

Individual identity is more than just domestic identity – it is influenced by local geography and environment. Looking at a comparative study in California, people were asked to describe their community identity and they described it as a 'sense of belonging' characterised by emotional ties. Village people referred to themselves as 'small-town people', seeing themselves as friendly, family-oriented and non-materialistic. As a result, country people were seen as easy-going, independent and practical. This type of community identification shows the limited value of traditional sociological images of community (Department of Sociology, Holy Cross College, Worcester, MA David M Hummon). The realities of community identity, as described by the individuals who live in communities, are becoming more complex.

Quality of life in rural areas is multi-dimensional and embraces a wide range of issues such as health, financial security, family and spousal relations, friendship, area of residence, recreational and social activities, transportation and government services. In modern society, traditional forms of identity and community are changing. The shared framework of beliefs and values which ordered life and defined identity in traditional society is weakening (S Sayers, Identity and Community, 1996). New attitudes and values, the rise of the individual and changing demographics and family structure all help to shape today's communities. Older people, as the fastest growing age sector, will play a defining role in this.

The concept of communal identity therefore takes a different form in newly-developed, self-contained retirement settlements. Intelligent mobility solutions for these settlements include accessible facilities and therefore impact on the communal neighbourhood. Interaction with other residents is particularly important as retired people generally have more time available to work within the community. Autonomous transport modes within the village and connecting modes of transport to nearby stations and neighbouring communities bring a sense of belonging, independence and security to its inhabitants. Connected geographical elements become an important part of the process of establishing a community's identity.

An ESRC study (Growing Older Programme) included a survey of a wide range of dwellings in three different locations: metropolitan urban; suburban and small town; village and semi-rural locations in England (S Peace, C Holland, L Kellaher, 2003).

The research summarises:

'Older people live in cities, towns and the countryside; alone and with other people. In extreme old age, a greater proportion of the population live in non-domestic age-segregated settings. This research aimed to advance our understanding of the connections between living environments and the maintenance of identity and well-being in later life; and to develop personally relevant tools for evaluating different kinds of living places. These living places were taken to include the dwelling itself, its setting, and the spaces that connect and separate inside and outside; private and public'.

The key finding of this research study strongly suggests that a life of quality is achieved when an older person can adopt strategies that allow sufficient well-founded connections to the social and material fabric of everyday life. User research conducted in rural Ireland as part of this study confirmed this. The older local residents of the Irish countryside visited stated that their lives were significantly improved by the minibus service that operated 'door-to-door' and took them to various social activities and community events in which they could participate. Good transport played a key role in helping them engage with their community. However, while this service solves some problems, it is by no means a complete solution when seen in the wider context of rural mobility. Problems remain, as indicated by the following paragraph from the same research:

'No longer being able to go out or move independently was a critical stage in identity construction. Without the wider contexts beyond or within the dwelling, the home by itself could become diminished as a source of identity construction. People in this position either made what arrangements they could to be taken out from time to time or used substitutions for going out that included other people, information, memories and mementoes, and talk about places.'

Older people may encounter difficulties due to lack of mobility, increasing frailty, lower income and greater social isolation. Even a physical barrier such as stairs or uneven ground can become hazardous and difficult to negotiate for an older person with multiple minor impairments. These are not exclusively rural problems but a lack of information about available services or community events limits connection to what is going on and increases any sense of exclusion in a rural setting. Systems that can link with people living in a low-density rural environment will help a community to build up a stronger identity and promote individual independence.

A strong identity can be more important to an individual's quality of life in a rural community than might be the case in a suburban or urban context. It can impact on different aspects of life in a way that is less pronounced in the city. It has to do with transport modes and vehicle concepts but also with social and physical integration within the community.
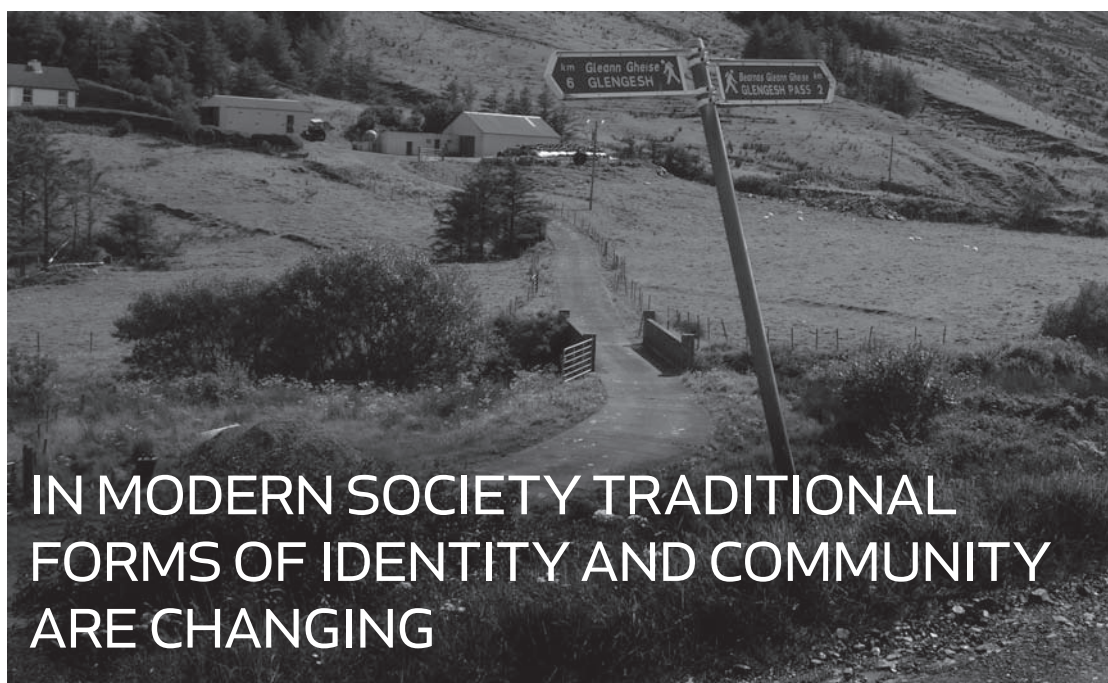
IN MODERN SOCIETY TRADITIONAL FORMS OF IDENTITY AND COMMUNITY ARE CHANGING

Daily accessibility is an important part of the identity equation. People routinely need to travel to shops, recreational facilities, social engagements and for medical treatment if their everyday needs are to be met. In most small villages such excursions can be undertaken on foot, but sometimes services are needed that lie further afield. This impacts upon identity; whilst inhabitants may identify with their local village, they will need to look further afield for specialist advice, healthcare and community connection.

Looking at the history of rural communities can be illuminating. Events such as going to church or attending fairs brought people together and these rituals can be reinterpreted for a contemporary context. Monthly events that bring services to the village green can help stimulate inter-generational access to information and services that they would otherwise have to travel to visit. Mobile health clinics, libraries, training units, police services and advice could all be combined into a multi-faceted village event rather than existing as disparate, sporadic events.

Even with such events being brought to the village doorstep, transport mobility still remains a vital issue. Public transport is often characterised by patchy and infrequent services, inconveniently distant bus stops or stations, rising costs, limited routes, and exposure to the elements.

Inadequate transport/mobility can result in a sense of isolation and, in extreme cases, depression and mental ill-health. A combination of mobility and transport systems that deliver 'door-to-door' services, and simplified information and communication systems improves the well-being of older residents and builds a stronger identity for the entire local community.

Designing for Identity

'Sharing' by Jung Hoon, Paul Howse and Pierre Sabas looked at the growth in early retirement villages in the countryside. People who settle in such developments are looking to pursue a particular kind of post-retirement life that is both active and connected. The team proposed a range of vehicles for local transport, owned by the village rather than the individual, establishing a social network and communal responsibility based on transport. To enable people of all ages to travel, three autonomous vehicle types were created for different journey lengths, purposes and passenger numbers. The first one is a bicycle-based, hybrid vehicle that charges its battery by pedal-power and solar energy and is used purely for short distances within the village. The second car-based unit takes residents to the close-proximity bus stops or rail stations to connect to national transport systems and the third, larger vehicle is built for longer trips to other towns, villages and facilities. All vehicles are owned by the community but used by the individual, allowing mobility services to become a key part of the village's identity.

The 'Event' team comprising Ceri Yorath, Dhanush Pilo and Joonas Vartola drew on the notion of enriching community identity by drawing together individuals in a 'village green' event. One idea created a sporting event in the village where the race cars were built by multi-generational teams of locals. The whole village closes the surrounding roads on the race day and winners then move on to compete with neighbouring villages up to national level. Another concept created a vehicle that connected with three others to form a large, mobile space for entertainment or education, providing secure, customisable room for interaction.

A Helen Hamlyn Research Associate project for bus design company Optare by Owen Evans in 2003 looked at designing a mixed-use vehicle that brought different local services to people in rural, isolated communities. *(www.hhc.rca.ac.uk/archive/hhrc/programmes/ra/2003/ owen.html)* •
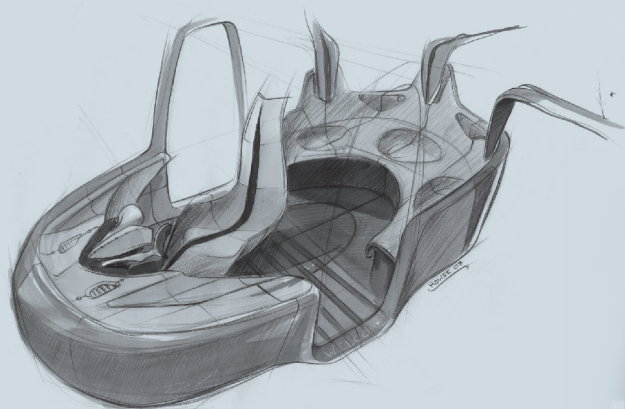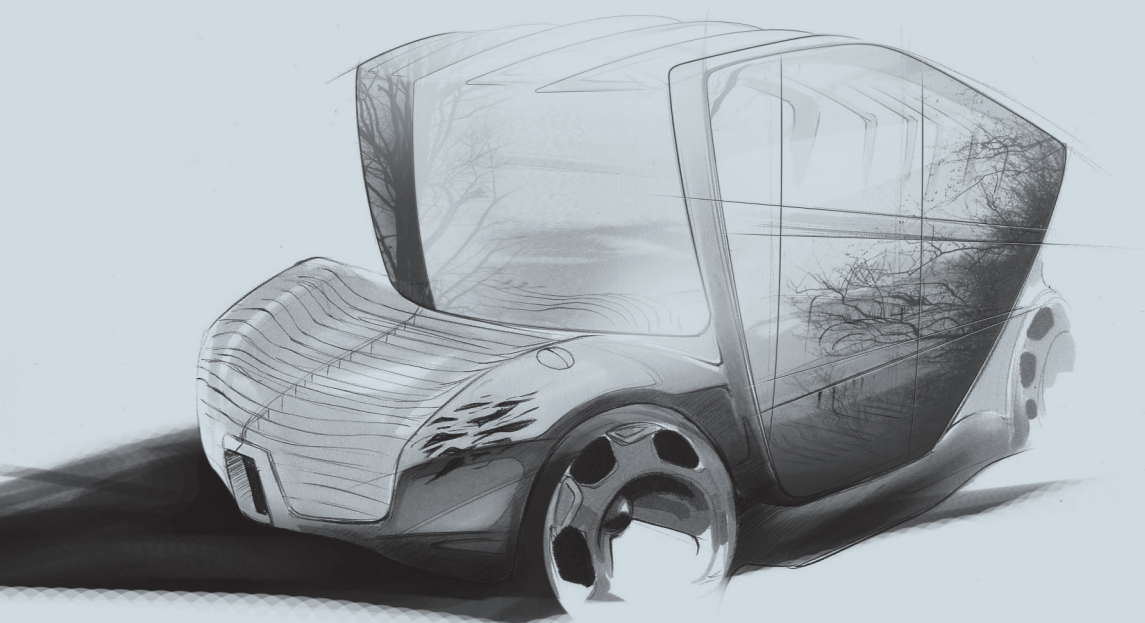
'Sharing' by Jung Hoon, Paul Howse and Pierre Sabas. Different vehicle are shared by the village rather than owned by the individual

Implications

There are several implications for this theme as follows:

1. Identity is driven by individuals but belongs to the community.

2. Older people will have an increasing role in establishing community identity, especially as the baby boomers – known for their readiness to speak out – redefine being pensioners.

3. Individual identity can become an important issue for older people who are often marginalised by society. This can also be true for teenagers and children.

4. The levels of connectivity between individuals go a long way towards determining community identity. This goes beyond transport connectivity to encompass digital and social connectivity as well.

5. Because of multiple minor physical and cognitive impairments, connection at all these levels can become more difficult for older people. Design of systems, services and devices should enhance a person's individual perception of their identity.

6. Territory plays an important role in establishing identity. Individuals can identify strongly with local areas and become fiercely protective. Helping to establishing identity for a local community is a positive activity and should be managed so as not to result in separation and division.

7.   Local culture and history also play a role in establishing identity. It can be difficult for newcomers to a rural region to fit into the community.

8.   Identity for older people living in small towns and villages is about good quality of life and social and physical integration within that rural space.

9.   People have to travel to access services in rural areas. Village-owned mobility systems could help establish local connection and identity.

10. Village-owned transport systems will be conditioned by a digital infrastructure. Individuals will need to have easy access to booking and using vehicles and the community as a whole will need an easy way of maintaining and monitoring multi-user transport systems.

11.   Digital services can help to make an individual feel part of the community by providing good access to local information, services and news.

03
Inter-Generation

Older people are often assumed, tacitly or implicitly, to be a group outside mainstream society. Accordingly, in the world of design and innovation, when the needs of older people are considered at all, this is frequently done in terms of particular age-related needs or requirements.
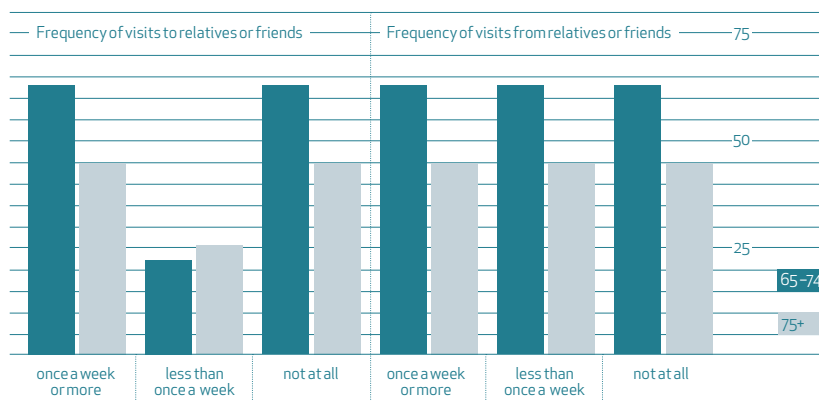
above and opposite page: Inter-generational contact can be encouraged during community events

left: Percentage of older people making visits to and receiving visits from friends or relatives by age, Great Britain (source: General Household Survey, 2001)

Frequency of visits to relatives or friends — Frequency of visits from relatives or friends

65–74
75+

once a week or more | less than once a week | not at all | once a week or more | less than once a week | not at all

Every older person, however, is connected to other people – family, friends or local community – and so should be considered as part of a multi-generational society, not a member of an isolated group. By focusing age-related research on how all generations interact with each other it not only becomes possible to take a more humanely inclusive view, but also explore a far richer range of options for design intervention.

The inter-generation theme focuses on generational relationships and considers the benefits of seeing older people in context rather than in isolation. In particular it looks at how multi-generational living can provide a foundation for improving the quality of life for older rural dwellers.

What is the importance of inter-generational relationships for older people living in rural areas and how do they impact on health, well-being and everyday life? The designers working on this project visited rural Ireland to talk to older residents about these issues.

Two important inter-generational dependency issues emerged: travelling to shops and visiting local facilities or services. Although most pensioners relied on their children, grandchildren or neighbours to transport them, they were nonetheless reluctant to ask for help all the time. Even when strong family bonds existed, the older people still wanted to be independent and not solely reliant on younger people.

A study based on the data from the Bangor Longitudinal Study of Aging (BLSA, 1979–1999) examined changes in the inter-generational relationships of people aged over 65 over a 20-year period between 1979 and 1999. It looked at various relationships – parents with adult children, grandparents with grandchildren and aunts/uncles with nieces/nephews – to show how the rural environment impacts

on family structure, migration and support patterns (G C Wenger and V Burholt, 2000). The study identified four different patterns of intergenerational relationships, finding that the traditional generational roles established in the previous century are changing and family hierarchies are less subject to authority and discipline dictated by age alone.

Further research focusing on the nature of grandparent/grandchild relationships emphasises their dynamic nature (N Ross, M Hill, H Sweeting and S Cunningham-Burley, 2003-2004). Its findings suggest that connectedness between grandparents and grandchildren is important in influencing the relationships the grandchildren have with other family members and with friends, and grandparents play an important role in the development of their grandchildren.

Research conducted by the RCA Helen Hamlyn Centre (Kecman 2006) indicated that in a typical multi-generational family, the parents are actually the figures of authority, with grandparents and grandchildren often collaborating and sharing secrets. In one family it was noted that the teenage daughter and the grandmother, both of whom lived in the same house with the parents, shared a need for privacy and time away from the mother who was seen as a controlling figure. This led to the establishment of 'grandmother-granddaughter' time, a weekly excursion where the mother was not allowed to intrude.

Children often feel that they can communicate more directly with grandparents and this part of family life should be encouraged and extended into the community. Young children, teenagers and older people actually share some commonalities. All may feel marginal to mainstream society and therefore less connected or valued. Such problems can be exacerbated in rural areas with fewer transport options and digital connectivity. On the other hand solutions can also be more creative since the idea of 'community' can be more pronounced in rural areas than urban areas; opportunities for the generations to interact may therefore be greater in rural settings.

Grandparents also mention taking grandchildren's friends on outings or collecting them from school along with their own young grandchildren. This establishes an important multi-generational connection with their grandchildren's peer groups. Grandparents living in sheltered housing or care homes also get to know the grandchildren of fellow
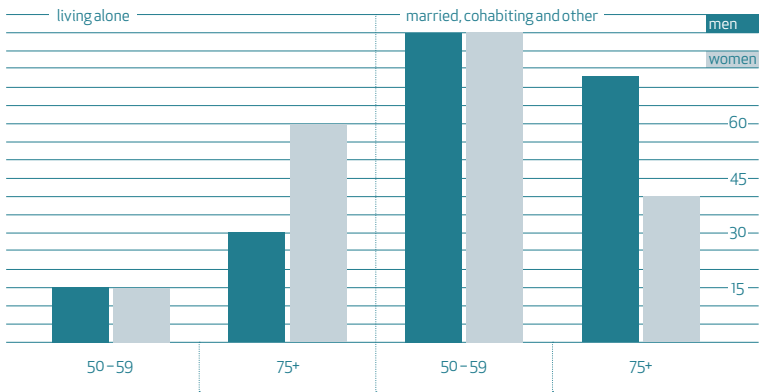
left: Living arrangements of older people by age group (in millions) (source: General Household Survey, 2001)

MOBILITY ALSO EXISTS IN VIRTUAL SPACE WHERE PEOPLE INTERACT AND ACQUIRE INFORMATION

residents through visits, conversations and photographs.

Close involvement with a grandparent can encourage a better appreciation of elderly people in general so encouraging greater sensitivity towards their life circumstances and needs.

Populations do not remain static. Many rural areas witness high rates of in-migration, particularly amongst the elderly and retired, and out-migration amongst young adults. Older people are attracted to the idyllic image of country living and a better quality of life, while younger people go to the city seeking better job prospects and social activities. For grandparents and grandchildren who are geographically separated, digital connectivity starts to play an important role in maintaining inter-generational communications.

When looking at physical connectivity, the private car, as a dominant form of rural transport, becomes a useful tool in mapping some types of inter-generational dependency. The parent is generally the main transporter of children when young, but as they age, the situation is reversed and they become more dependent on their offspring.

Older passengers can also be dependent on their partners. Difficulties can occur for a passenger when the main driver becomes too frail to handle a vehicle or after the death of a partner who was the driver. In general, once a person gets older and is unable to drive

themselves, they can experience increasing difficulty in obtaining lifts and consequently become more isolated.

Patterns of work also play a role in the inter-generational context. The new Standard Retirement Age (SRA) indicated that in the 1970s and 1980s employees could look forward to a prolonged, healthy post-employment life as life expectancy increased and early retirement became increasingly popular (Green 2006). Companies were encouraging older workers to retire earlier and were offering early retirement packages wholesale across a range of industries. However by the 1990s the trend had reversed and staff were being encouraged to continue to participate economically up to, and even beyond, the SRA. The knowledge and experience of older workers were seen to be of value, and companies began to work to create an approach that allowed people of different generations to work together. The UK Age Discrimination Act of October 2006 wrote this into legislation, and combined with the proposed raising of the SRA, it meant that grandchildren could end up working alongside their grandparents in the workplace of the future.

This has important implications for rural mobility. The UK government now has a target to raise the employment rates of people aged 50-69 years and reduce the gap between the employment rate of older people and the

overall rate (Green 2006). Existing problems with rural mobility will be further exacerbated for an ageing workforce that needs to commute. Car-sharing schemes with younger neighbours working in the same vicinity could be one of the practical solutions and might be facilitated by digital connections and networks across a working neighbourhood community.

Mobility is not just about good transport connections; it also exists in virtual space where people can interact and acquire information, and in the social spaces where they meet. A balanced approach is the key to managing dependencies across the age spectrum and should deploy a variety of channels. Older people should not feel that they are being supported all the time, rather they should feel part of a mutually supportive transgenerational community empowered by physical and virtual communications.

Better interactive tools and communication can benefit everyone, not just older people. Regardless of age, patients need improved access to healthcare, most people enjoy improved communication with their friends and everyone wants reliable and punctual travel options. In these situations, the needs of elders stand side by side with the needs of younger generations and age becomes less relevant.

'Technology' is an emotive word that can mean different things to different generations. Older people are less likely to adopt technology that is not explicitly useful. Innovative companies should introduce intelligent measures to help local and regional services use technology to meet the needs of people of all ages.
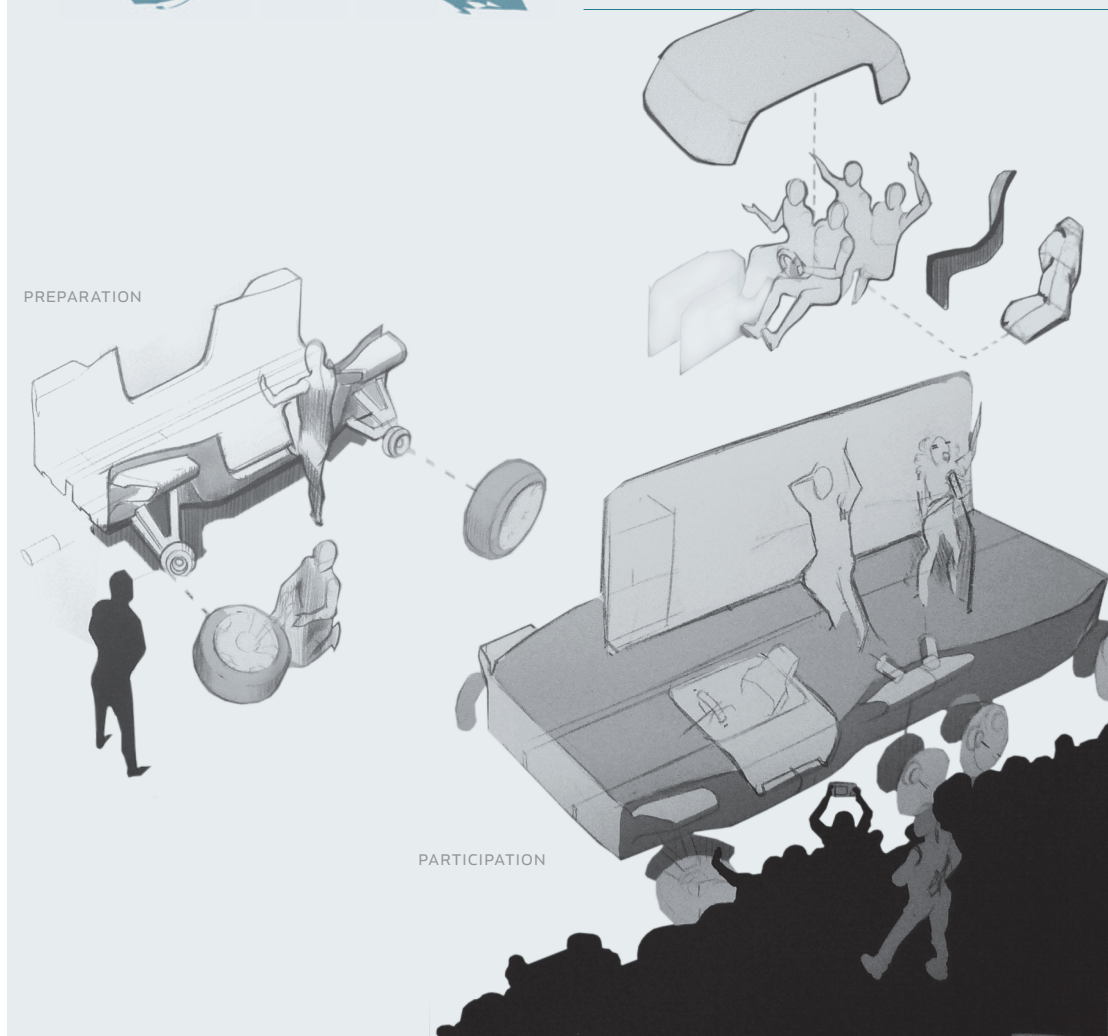
Designing for Inter-Generation

Vehicle and interaction design thinking cannot only demonstrate solutions for better mobility but can also enable the older generation to engage with other age groups and minimise the effects of social exclusion.

The 'Event' series of design concepts by Ceri Yorath, Dhanush Pilo and Joonas Vartola builds on this idea of inter-generational meeting by connecting rural dwellers with their family members and community in new ways. One idea creates accessible vehicles that come together on the village green to offer enclosed spaces where villagers can meet for events regardless of the weather. Special areas allow grandparents and grandchildren to interact away from the authority of the parents. Another idea proposes a mobilised village fête that can be transported to surrounding areas. Yet another creates a racing event for the village, where father and son, grandparent and grandchild or friends and family can come together to build a low-tech race-car, so spending quality time with each other on an activity that ultimately links in with the rest of the community.

The autonomous, 'My Space' vehicle concepts by Jon Raadbrink, Dong-Kyu Kim and David Gonzalez highlight the significance of a teenager's need for personal, developmental space whilst giving him or her opportunity to visit nearby relatives such as grandparents. A rural vehicle concept with flexible interior layout provides young people with a mobile living area to entertain rather than having to depend on space within their parents' house. The 'i-car' ideas by Reg Kingston, Raquel

'Event' by Ceri Yorath, Dhanush Pilo and Joonas Vartola; Drawing by Dhanush Pilo. Villagers come together to create a special vehicle for a race event.

PREPARATION

PARTICIPATION

Lopez and Arturo Peralta also address inter-generational needs as such a system must work for people of all ages. These driverless, road-based designs vary from flexible individual transport to communal vehicles with inter-generational facilities.

A Research Associate project by Maja Kecman in 2006 for Research in Motion also looked at multi-generational issues and focused on the need to consider older people within a familial and societal context, rather than as isolated test subjects for design. (www.hhc.rca.ac.uk/archive/hhrc/programmes/ra/2006/p4.html) •

Implications

The outcomes of this theme have various implications as follows:

1. Older people need to be seen in the context of their lives rather than treated as individual test subjects. Linking the generations and understanding interactions is very important.

2. Dependency needs to be balanced with independence. Younger generations should be encouraged to view older people as valued members of the community, not just passive recipients of help.

3. When older people do need help, asking for it should not be an awkward, lengthy or demeaning process.

4. The service providers that older people come into contact with will mostly be younger – i.e. social workers, postal workers, police officers, bus drivers – so training these providers is important. Even the most age-friendly system or service will fall down if individual operators are not trained to be age-friendly.

5. Having someone to call on in an emergency is important to rural elders. It is vital to provide a trusted link to services that offer immediate help as well as to younger family members.

6. Village- and community-based multi-generational interaction can be encouraged through the organisation of village fairs, car boot sales, farmer's markets and special days in village pubs. Such existing events should be built upon.

7.	Older and younger travellers have different needs, but systems and services should always cater for the older, by default. Younger people will never complain that a train is too accessible or signage too easy to read.

8.	A technology divide exists between the young and the old but technology should act as mediator and enabler of communication between generations.

9.	Multi-generational communication can skip generations. Children will often find their grandparents easier to talk to and scheme with than their parents who have to uphold authority.

10.	Today's parents are tomorrow's grandparents and they will be a different type of pensioner.

11.	Some changes take place over generations and so any plans need to take account of the future.

12.	Transport and mobility systems should be designed for a multi-generational context rather than catering for isolated consumer types.

04
Integration

Integration is an important social concept that has been much publicised and politicised. What does integration mean for older people living in rural areas?

left: Technology plays an important role in creating good mobility and social integration. View of wayfinding aids for the driver of a local minibus service for older people

This theme looks at the different aspects of a good, integrated solution including social, geographical, physical and digital elements. Within this framework, mobility becomes a key enabler to promote integration by creating better connections between scattered groups of individuals and the services and support systems they require. Integration is subject to many influences, but at its heart is the principle of social cohesion. Just as social cohesion is a concept that includes economic, political and socio-cultural dimensions (Jenson 1998, Bernard 1999), so does integration (Revanera, Rajulton, and Turcotte 2001).

Several factors make it difficult for older people to achieve better social integration. These include health problems, loneliness, isolation and changes in their social network and structure (Rothe, 1990). For successful integration into the local community, elders need both formal and informal support (such as access to good healthcare and contact with family and friends), but they also need to be in charge of their own wellbeing and development. Physical mobility, particularly outside the home, is beneficial in promoting social integration and personal health through engagement with the community and surroundings whilst enhancing the independence and daily control that everyone needs to have (Lemon et al, 1972).

A basic level of physical activity and social interaction has been shown to have a positive effect on an individual's view of ageing (Ryff, 1987). Other issues such as life satisfaction (Larson, 1978), health status (Lawton, 1985),

and everyday competence (Baltes et al, 1993) also contribute. A better understanding of older people's daily activity patterns is important in creating integrated solutions that allow older adults to live as part of their community and surroundings.

Although the world population is growing, the proportion of people living in rural areas has been declining, particularly where agriculturally-based employment is shrinking and the community is unable to attract or support alternative sources of employment. The structure and integrity of many rural communities comes under stress as a result.

If countries like Ireland are to retain a substantial proportion of their countryside population, vibrant communities and the services that support them will need to be developed and maintained. Mobility lies at the heart of the solution.

Older people living in the countryside in the UK are neglected compared to their equivalents in the USA (Glasgow 1998) with many older people in rural England prone to poverty, deprivation and exclusion. This is significant since the average age of rural residents is higher (50 years) compared to that of urban dwellers (42 years) and set to rise. Older people migrate to the countryside for improved quality of life, lower house prices, reduced crime and better standard of living. But according to Harrop and Palmer (2002), a quarter of these older people live on very low income and this percentage increases to 29% in more remote areas.

Settlement policies are needed that take

into account a variety of rural development contexts. Areas with declining populations and areas with overspill from nearby urban centres experience different problems. One village might suffer the closing down of local services such as post offices and health centres, whereas another may become 'gentrified' due to the urban wealthy buying a second home in the country and pricing out the locals. Enhanced accessibility must be integrated with a settlement policy to ensure that rural communities are not devastated or changed beyond recognition.

A key aspect of integration is good access to local services, but many rely on local shops, post offices, public transport and primary care services that are being closed down. Of rural settlements in England and Wales in 2000, 78% did not have a general store, 72% did not have a small village shop and 53% did not have a pub. Between 1991 and 1997, a total of 4,000 food shops closed in rural areas. In Wales, a survey revealed that 65% of communities with fewer than 500 people did not have a general store. There is also evidence that older rural people may be losing out financially as they do not have integrated access to information about financial support and help from social services.

In populations below 1,000 people, more than 85% of communities do not have a GP surgery.

This clearly has dire implications for older, less able residents as well as affecting other groups such as mothers with young children, adolescents, disabled groups, those with no access to private transport, the very poor and the very ill. People are less likely to use a GP surgery, hospital or day clinic that is far away, but some have no choice. In Ireland 40% of parents visiting children in hospitals in Sligo, County Cork (with its large rural hinterlands) and Dublin travelled over 40 miles; 30% of them lived over 100 miles away. Distance is a particular problem for those with a limiting long-term illness, something which most commonly effects older people. Of 1.6 million diagnosed with such conditions, 20% live in sparsely populated areas.

This problem is something that has caught the attention of the NHS and the press. The following quotes demonstrate both the financial and personal costs involved:

"There has not been a proper allowance for the extra problems of providing primary care in rural areas. If a GP or nurse has to drive 10 miles to see a patient, that will cost more. If the GP has to dispense medicine because there are no other local services, that will cost more too". (Michael Dixon, chairman, NHS Alliance).

DELIVERING SERVICES REQUIRES AN INTEGRATED TRANSPORT STRUCTURE, BUT LACK OF TRANSPORT REMAINS A MAJOR RURAL ISSUE
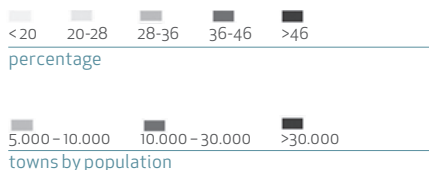
left: Households with internet access as percentage of total number of households, 2002-2020, (source: Rural Ireland 2025. Foresight perspectives, 2005; NUI Maymouth, University College Dublin and Teagasc; map 7; 60)

"An 87 year-old woman with breast cancer is being forced to travel more than 500 miles a week for treatment because of a lack of locally available services. Muriel Buckby has to make three 175-mile round trips every week from her home in mid Wales to a radiotherapy unit in Cheltenham, Gloucestershire. Each journey takes her more than four hours by car which her family fears is taking its toll on her fragile health and leaves her completely exhausted."
(Society Guardian)

Delivering services requires an integrated transport structure but lack of transport remains a major rural issue. About 39% of all District Electoral Divisions in the Republic of Ireland have no train or bus services and only 30% actually have a daily morning or evening commuter service. Buses that serve remote rural areas are few and far between. In rural areas, bus mileage has fallen from 190 to 177 miles per person per annum and over 40% of remote rural households in Scotland wait over one hour between bus services compared to

1% of households in urban areas. More than 40% of rural respondents to a recent Northern Ireland survey said there were no nearby bus services to take them to local shops and other facilities.

The internet has the potential to address some of these problems both through online shopping and through web communities that afford virtual access to services and other people; however it is by no means a definitive answer. While 95% of urban households in England and Wales have access to affordable broadband internet services, only 7% of rural villages and 1% of remote rural villages are connected. People over 65 are significantly less likely to use broadband at home using what they may consider to be unfamiliar computer technology. Those in local authority or housing association accommodation and those with low incomes are even further away from a digital solution.

It is also important to understand that older people are not one homogenous group. The 30-year age difference between a 60-year

old and a 90 year old is after all the same as that between a 30 year old and a 60 year old. Recent research (Age Concern 1996; Help The Aged 1996; Wenger 2001) highlighted the need to understand not just needs and aspirations but also the importance of age 'groupings' (for example, 50-65; 65-74; and 75+) as well as differing types of rural areas, remote and rural coastal towns, and size of residence.

Gender is also an important issue. The British Crime Survey (Nicholas, S. 2007) shows a widespread perception that crime rates in rural areas are rising and in England, fear is a major contributor to social isolation of older women.

Particularly affected is the current generation of over 75s who, unlike their male counterparts, never learned to drive. Many do not leave home after dark and are concerned about their safety during the day. Local Age Concern groups report being unable to run lunch clubs in rural areas because of high levels of fear amongst older residents – a real barrier for social integration and inclusion. The resulting loneliness and isolation effectively create a rural prison.

below and facing page: 'Flow' by Sergio da Silva, Junwoo Jeong and Ilaria Sacco. An integrated system where small, autonomous vehicles interface with public transport services for seamless transfer of passengers
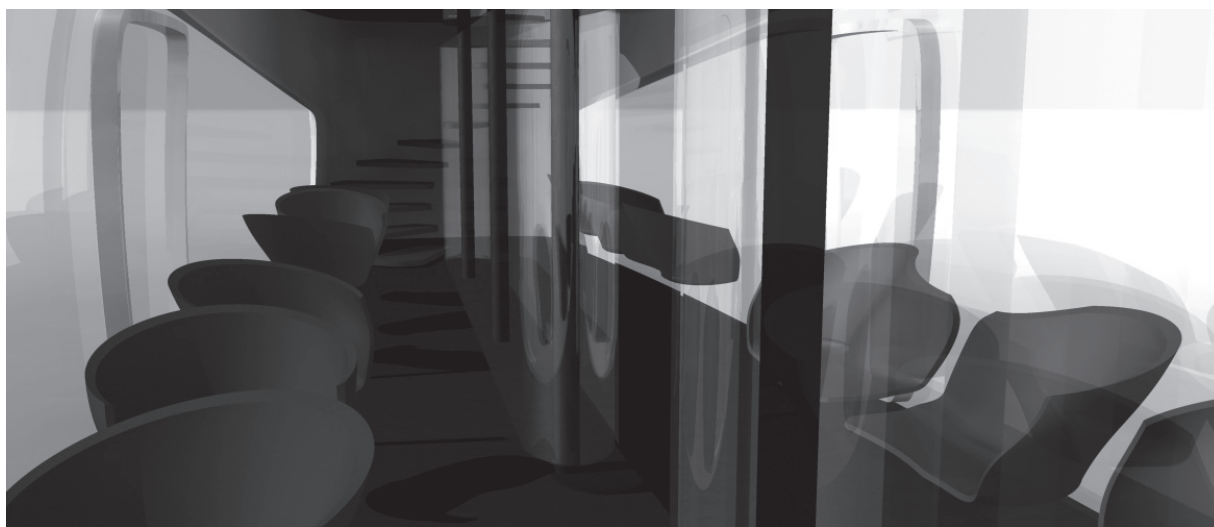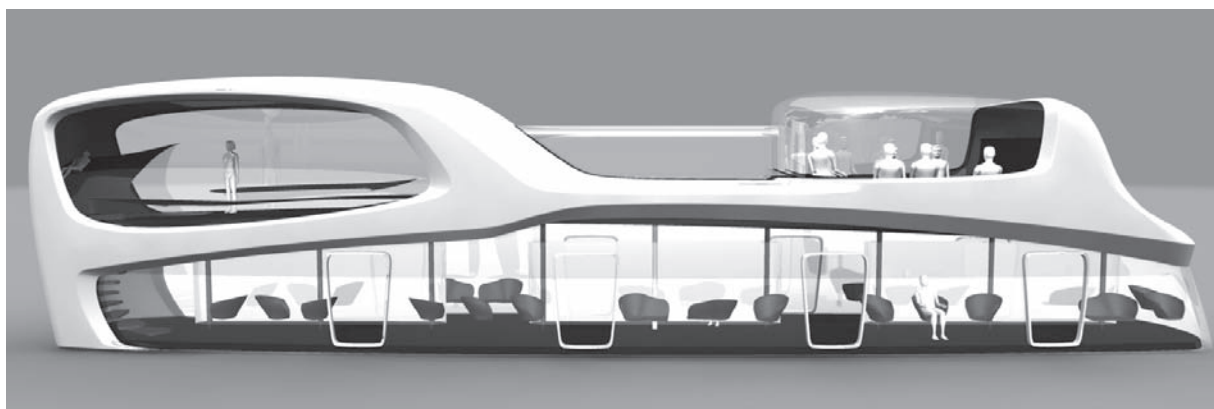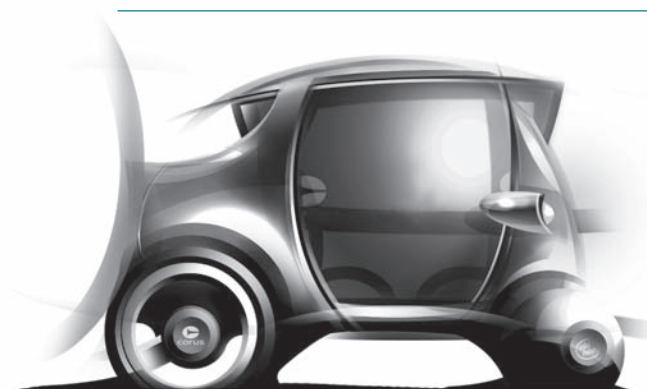
Designing for Integration

To provide good public transport services in the future, two prerequisites must be met. Villages must be built more densely, so that local settlement-nuclei support affordable services. Vehicles must become more flexible in terms of size and operation. Standard bus services, which only operate between bus stops, have to be complemented or substituted with more flexible services.

'Flow', a concept developed by Sergio da Silva, Junwoo Jeong and Ilaria Sacco effectively delivers travellers from door to door. Mobile units that form part of the house take people to the local station and transfer them to a train. Smaller units seat two people and can 'platoon' to form a mini-train. Large units can cover greater distances and have a living room layout to enable interaction with their inbuilt technology and fellow travellers. The system demonstrates an improved integration of services, digital information and different forms of transport; the inherent benefits of both public and private modes are utilised. For older people such a system gives a safe, cost-friendly option that allows travel at both local and national distances, thereby enabling greater social connection and mobility.

The points raised are also addressed by two more projects. 'Sharing' by Jung Hoon, Paul Howse and Pierre Sabas proposes a range of vehicles for local transport, owned by the village rather than the individual. This establishes a transport-based social network and sense of communal responsibility. The 'i-car' project by Reg Kingston, Raquel Lopez and Arturo Peralta also demonstrates the benefits of integrating services, in particular digital services and transport infrastructure since the vehicle can be ordered to pick up customers from wherever they may be.

A Research Associate project with Capoco Design conducted by Merih Kunur in 2004 created a mass transit system for the city where single, driverless units move around small city streets picking up passengers and coming together to form an express train on highways. The system integrates digital technology and a driverless capability and can be used on existing urban road systems (www.hhc.rca.ac.uk/archive/hhrc/programmes/ra/2004/ra04p9.html). •

Implications

The implications for digital service providers are as follows:

1. Mobility is a key enabler of integration allowing the individual to develop a relationship with his or her community and the local area itself to be connected to other areas.

2. Integration is about access to other people as well as delivering information and services such as health care. The journeys involved might be local or distant.

3. Integration is about giving an older person both a motive and means to leave their own home. It helps to keep people mobile.

4. Populations are ageing across the globe. With their markedly older populations, rural communities are under greater pressure to integrate older people and cater for their needs.

5.   Integration is impossible if older people are seen as one homogenous group. A 90-year-old is different from a 60 year-old and people anyway like to be seen as individuals.

6.   Although people access services locally, some specialist services such as healthcare force them to travel long distances frequently.

7.   The internet does not offer a complete answer to digital integration; many older people are digitally excluded.

8.   Digital or remote connection does not replace physical contact for this age group.

9.   Enhanced mobility solutions can help to form a community and to sustain it.

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Partners

RCA Helen Hamlyn Centre

The Royal College of Art Helen Hamlyn Centre is a multi-disciplinary centre for inclusive design. Its programme looks at how a socially inclusive and human-centred approach to design can support independent living for ageing and diverse populations, improved standards of healthcare and patient safety, and innovation for business. It responds to the commitment in the Royal College of Art's Charter to 'advance learning, knowledge and professional competence' in relation to 'social developments'.

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RCA Vehicle Design

The Department of Vehicle Design seeks to pioneer new approaches for our mobile futures. Central to the course methodology is the understanding of the broader issues of vehicle design necessary to optimise opportunities for mobility, including accessibility, aerodynamics, environmental impact, ergonomics, legislation, materials, production, safety and technology, as well as aesthetic principles.
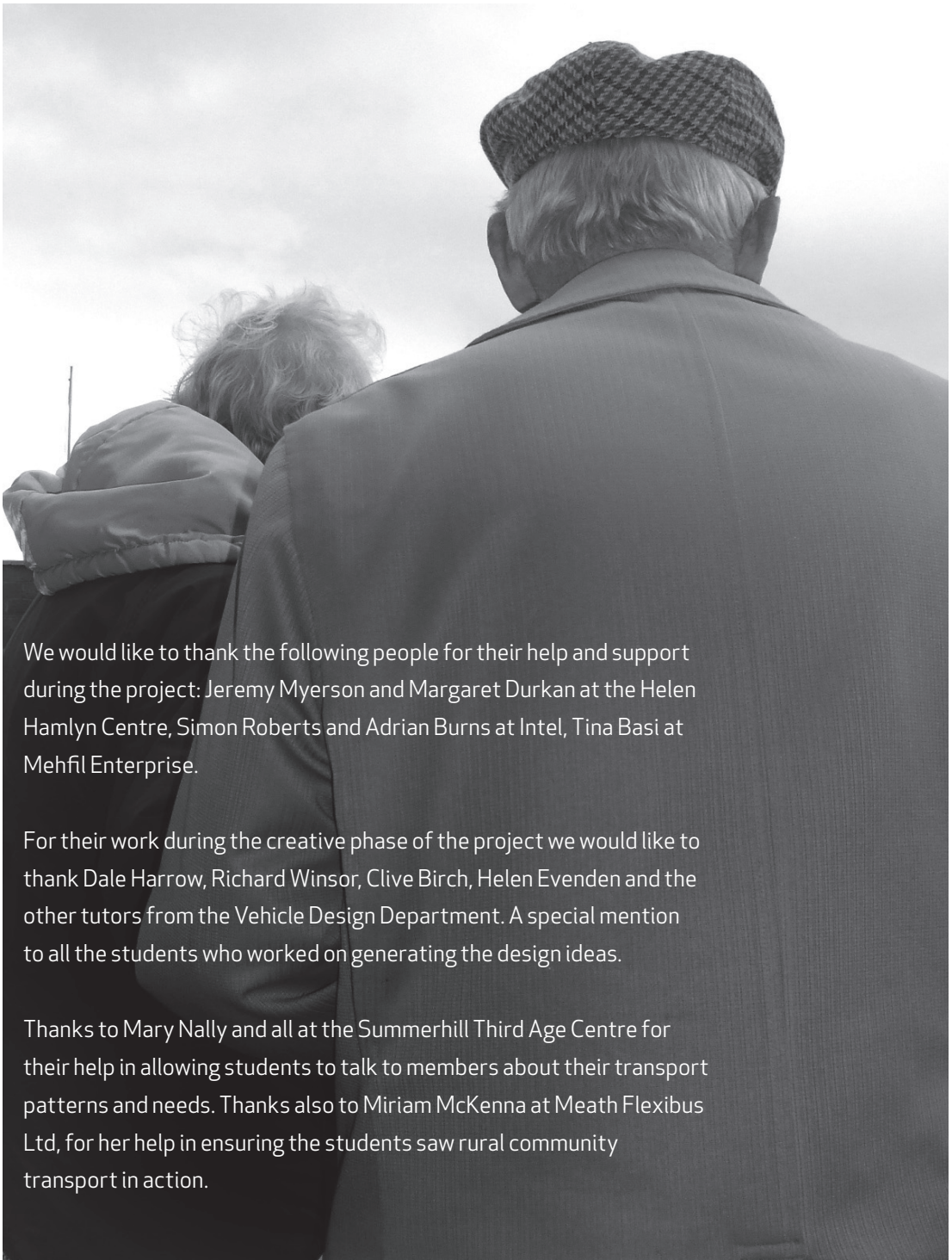*www.rca.ac.uk/vehicle*

Staff
Professor Dale Harrow, Head of Department
Richard Winsor, Senior Tutor
Clive Birch, Course Tutor
Helen Evenden, Course Tutor
Sheila Clark, Textile Tutor

Student Teams
A Jon Raadbrink, Dong-Kyu Kim, David Gonzalez
B Arturo Peralta, Raquel Lopez, Reg Kingston
C Yun-Woo Jeong, Ilaria Sacco, Sergio da Silva
D Ceri Yorath, Dhanush Pilo, Joonas Vartola
E Jung Hoon, Pierre Sabas, Paul Howse

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