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Introduction

- Innovation Fund Denmark (IFD) invests in society and its citizens to prepare Denmark for international competition and at the same time equip its citizens for a well-functioning and thriving life in society. This investment strategy focuses on society and people. The strategy reflects the aim of IFD to invest in projects that exploit scientific research and create social and economic value for society, its citizens and the participating project parties. These projects should involve knowledge-based solutions to important challenges in society. The nature of these challenges will typically require a close collaboration between different disciplines, scientific research and practice when searching for a solution. It will often be necessary to bring in specific technology as well. For IFD it is therefore an essential requirement that all research or innovation projects involve the parties most relevant for meeting the challenge and the technology that will be of best use and value to the project. A challenge-driven and problem-based approach may emphasise different perspectives and methods. Projects that address researchable societal challenges may deploy many different tools in bringing about results and solutions – but the challenges to be addressed should be of current relevance to Danish society, and so should results and solutions.

- The strategy centres on societal challenges that require innovative solutions. The strategy does not cover all of IFD’s focus areas within Trade, Services and Society, and neither all fields within social sciences, but gives priority to areas where there is relatively little knowledge and research available, or where research and innovation projects may make a significant contribution when it comes to finding sustainable solutions to societal challenges. IFD has chosen the following areas: Social challenges in society; Labour market and working life; Educational needs and new learning demands; The public sector and innovative measures; Consumption and individualisation. The described challenges are thus not to be seen as an exhaustive list of all societal challenges, but as areas in which IFD believes there is a need for special research and/or development. The topics will rarely be of exclusive relevance to Denmark, but the incentive for projects within the areas covered by the strategy must stem from challenges facing Danish society. It should be emphasised that within more of those topics an international approach will be appropriate.

- In its assessment of project ideas, IFD puts emphasis on excellent quality of research and innovation, value creation, as well as efficient implementation. This implies that results and solutions should: 1. Create measurable value, economic and/or societal and, when relevant, environmental, for the parties involved in the project as well as value for society and the individual; 2. Be tangible, i.e. be transferable and ready for implementation in practice; 3. Be based on a close collaboration between scientific research and practice to ensure the best possible implementation, dissemination and scalability.

- Besides the above general project requirements, IFD will focus specifically on the following when prioritising its investments within this area in the coming years:
• The investments should contribute to necessary transformations within society and/or groups of citizens through targeted strategic research and innovation.
• Transformations and transformation processes should always be operational and include relevant elements for measuring.
• The projects’ value creation should be described in clear and measurable terms, in view of both the economic and/or societal and/or environmental value (e.g. increased quality of life, influence, knowledge, more entrepreneurs, and better sustainability).
• The projects’ impact and value creation should be assessed during and towards the conclusion of the project.
• The way to implementation and general public acceptance of the project’s solutions should be described (Societal Readiness Level – cf. IFD website).
• The projects should preferably contribute to growth and employment in a short- or long-term perspective.
Shared elements in the 5 investment areas in The Future Society

In each of the five topics below, we describe challenges and associated research and innovation opportunities. There will be an overlap between the topics in way of elements that cut across one or more topics, e.g. digitalisation or the need for user involvement. In all topics IFD emphasises investments in projects where user orientation or user involvement – broadly speaking – are part of the project. Furthermore, it is important that the projects integrate differences in ethnicity, gender, age, and context. Also, IFD will be concerned with the international dissemination of the developed innovations. Moreover, it should be taken into consideration for all topics that challenges in modern society are complex by nature and will thus typically need interdisciplinary collaboration. IFD recommends that various scientific disciplines and relevant stakeholders participate in solving the challenges, including creative and artistic disciplines making design and aesthetics a natural and integrated element in the solutions, as well as sustainability, to the extent that it is relevant for solving the challenge and achievable. On the operational level, IFD places emphasis on the development of a strong collaboration in the projects. This is done in order to exploit the full innovation potential involved in building and exchanging knowledge across disciplines, sectors, businesses, and organisations. Through targeted strategic research IFD wants to: 1. Promote challenge-driven, problem-based development of new knowledge and smarter solutions within the main topics and related technologies, products and services; 2. Increase stakeholders’ innovative potential within the areas covered by the investment strategy and create a larger number of new and strong businesses, including innovative social enterprises, through a maintained focus on intra- and entrepreneurship.

IFD wishes to encourage social, environmental, and economic value creation in society and enable national and global growth for stakeholders. Also, IFD wishes to contribute to transforming Danish society to ensure a cohesive and harmonious society. Transforming society to comply with e.g. circular economy and resource optimisation may require new ways of organising society. Projects that involve different kinds of transformation will typically be very complex and challenging, as they will cover various issues and may often only be resolved through interdisciplinarity.

The strategy describes challenges facing society and its citizens. These are grouped in five main categories: 1. Social challenges in society; 2. Labour market and working life; 3. Educational needs and new learning demands; 4. The public sector and innovative measures; 5. Consumption and individualisation.
1. Social challenges in society

Economic, social, and cultural challenges may prevent the development of a strong competitive society. For example, social issues like poor integration of certain social groups in society are a burden on both the individual citizen and society, and there is a need for innovative solutions to such challenges in order to make society socially sustainable. Within this main category, priority is given to challenges concerned with the beginning fragmentation and polarisation of society; challenges concerned with citizens, businesses, and institutions in their transition towards a more sustainable, climate friendly society; and challenges concerned with vulnerable children and young people, not least young people from ethnic minorities. Within all of those three areas it is important that the concerned groups of citizens and relevant businesses, authorities, associations, or social networks are involved in the projects.

IFD is aware of the difficulties in detailing the economic value creation within projects in those three areas, but this value creation should nonetheless be described and supplemented also by estimates and analyses of the social and/or environmental value creation in the projects. Measuring impact and value creation – which in itself is a relevant research field for IFD – is necessary both during the project and towards the conclusion of the project.

Challenges concerned with fragmentation and polarisation of society

There are beginning, but clear signs of a societal challenge that may have a far-reaching negative impact on Danish society. The challenge reflects the increased fragmentation and polarisation within social, psychological, economic, geographic, cultural, and age-related fields. Such a development entails considerable costs both when it comes to the lack of exploitation of available human resources due to poor participation in society and to the increased expenses for the welfare state, as well as an increased division across the country when it comes to geography, conflicts, and mentality. Existing scientific research in this field is often of a purely descriptive and diagnostic kind, while IFD is interested in projects that may both identify and contribute to solutions to such challenges through an innovative approach. This could be research into the relationship between the ethnic majority and ethnic minorities, where specific models are developed for building social relationship and bridges between these groups through the involvement of the concerned citizens, authorities, and stakeholders in civic society. IFD will be interested in projects focusing on minimising radicalisation and organised crime as well. Also, it is possible to set up projects that can help a stronger social integration of, among others, socially weak or isolated citizens. Furthermore, there may be a need for developing projects that will strengthen the relationship between geographical areas, establish new communities, and activate local area resources, both in urban and rural areas.
1. SOCIAL CHALLENGES IN SOCIETY

Challenges concerned with the transition towards a more sustainable, climate friendly society

The transition towards more climate friendly values and climate friendly behaviour challenges sets new requirements to society and its citizens. It is therefore appropriate to divide the transition to green economy into smaller, well defined parts. At the level of society, climate change and the need for CO2-reductions require changes in energy consumption and energy sources. At town level there is a need for e.g. smart cities facilitating a climate friendly way of life, and at the level of the population, the need for transition concerns the restructuring of everyday life practices and routines. If people are to adapt a more sustainable and climate friendly way of life, this involves, among other things, that citizens adjust their energy habits, change their shopping habits, and modify their travel patterns. Scientific research lacks knowledge about both how such a comprehensive and radical transition process is best implemented in society, and how changes to everyday practices are picked up and adopted by citizens in a way that makes them durable – in the long-term as well.

Challenges concerned with children and young people, not least challenges facing young people from ethnic minorities

Various studies point at the need for developing preventive measures to protect children and young people from violence and abuse. To put a stop to this situation, a specific approach, addressing both the violators and the violated, is needed to deal with violence towards and abuse of children and young people in general and young people from ethnic minorities in particular. This particular research is required as these youngsters are over-represented in the group of young people exposed to long-term violence. Projects that explore the feasibility in ensuring protection from violence and sexual abuse through successful schooling or other measures will be considered relevant.

With regard to young people, not least young people from ethnic minorities, the educational aspect is of particular interest to IFD when related to integration. Projects within the educational field are expected to involve secondary educational institutions and other relevant educational stakeholders in an active collaboration. The aim is to uncover and remedy the causes of student-dropout, developing new strategies to deal with vulnerable youngsters, and testing the value of these strategies in order to find the best possible way of implementing the project’s solutions in a wider context. In all these areas it is crucial to consider the gender dimension.

With regard to drugs, and in particular novel kinds of drugs, the extent of abuse among young people and the consequences of this abuse may be underestimated. When looking at drugs and young people, IFD is interested in studies with a holistic approach to the field of drugs, including uncovering the extent of young people’s use of different drugs and the problems caused by this use. Furthermore, IFD would like to see projects focusing on successful interventions and the reasons for their success, as well as the development and test of new interventions with the active involvement of the youngster themselves.
2. Labour market and working life

Still fewer people are employed in industry or agriculture, while employment in the public sector and services is growing. Knowledge-intensive businesses have seen a considerable growth for some years measured both in revenue and number of employees, not least employees with a background in STEM disciplines (science, technology, engineering, and mathematics). Society is evolving from being an industrial society to a society based on knowledge as raw material: in the future more people will make their living from servicing, educating and entertaining each other, providing consultancy, and gathering and processing data and knowledge, and all businesses and sectors may undoubtedly expect further automation and digitalisation.

Automation and digitalisation

Digitalisation and automation will play a crucial role in many jobs, not only in manufacturing, but also in administrative and analytical work tasks in both private businesses and public service. Some jobs will disappear; others change, and new develop. This calls for new ways of dealing with the challenges and opportunities offered by digitalisation and automation in businesses and public service, and for new ways of building useful relationships between businesses, public service, unions, and citizens. These changes will have considerable impact on the population as well. IFD is interested in projects involving various stakeholders in the development of solutions for handling the specific consequences of digitalisation and automation for businesses, employees, and the population in general.

Regardless of the field involved, automation will require mental adjustment and new skills. This transition imposes new demands on both workplaces and employees: the workplaces must develop organisational, managerial, and collaborative ways of working suitable for a more automated manufacturing process, broadly speaking. Furthermore, businesses have to ensure that know-how, that cannot be technologically transferred or automated, is maintained and integrated as part of the new skills needed in the automated workplace. Also, employees should be able to be part of the automation process when it comes to control or programming. There will presumably be a higher demand for new kinds of education, continuing training, and a practical as well as user-friendly design of practices that are easily integrated in the everyday work life. IFD gives priority to projects that wish to focus on the personal, professional

Smart workplaces

Besides an increased need for skills within automation, digitalisation, and STEM disciplines, other novel features of working life will start showing. This includes the need for more diversity in the workplace and excellent intercultural collaboration skills among employees. Furthermore, it is important to develop a labour market with a better gender balance and lesser gender divide, to be able to draw more efficiently on the available pool of talent. If Danish businesses are to engage the most suited and innovative employees and attract young people, they will have to rethink
management, work practices, working life, and working conditions in order to consider new practices, possible job-share, employees’ individual needs, and continuing training. A similar issue arises with regard to retaining senior employees and building a stronger affiliation with the labour market within ethnic minorities. Also, finding suitable models for balancing work and family life proves a challenge for both employees and businesses. There is a need for flexible ways of working as well as technological solutions. The smart workplaces of the future include both. IFD gives priority to projects developing smart workplaces and their potential.

In the future, businesses are furthermore expected to need to hire people without the exact professional background required for the job, but with relevant social and intercultural skills – and then train them accordingly. This may be necessary in order to increase the level of innovation in Danish businesses through professional and human diversity. IFD gives priority to projects that involve development and testing of models for maximising and exploiting the available pool of talent in Denmark in the best possible way, including analysis and testing of innovative career or development programmes. This includes projects that focus on the transition towards Industry 4.0, and projects that involve new working practices such as digital platform economy. Similarly, there is a need for projects that wish to solve issues relating to poor integration of vulnerable groups in the labour market. Inspiration may be found in the service sector which has a long tradition for diversity in the workplace, as the sector employs many citizens from ethnic minorities and migrant workers. As only few service jobs can be moved to countries with a cheaper workforce, and most are expected to be automated only to a very limited extent, the impact on and experience with integration seen in this sector may prove important also in the future. IFD gives priority to projects that exploit this strength for further developing service businesses or for a strategic knowledge transfer to other industries.

More insecure employment contracts
Still more jobs are characterised by being fixed-term contracts or otherwise precarious ways of employment. Such employment contracts are insecure, give no labour protection, and are not regulated by collective agreements. They do thus typically not include pension, paid leave, or unemployment benefit eligibility. This puts pressure on both salaries, fixed contracts, and employment security, and it is and will be prevalent in all jobs and all sectors. Furthermore, this group of employees challenges the principles underlying the otherwise stable relationship and collaboration between workers’ and employers’ organisations, which is fundamental for the so-called Danish model. IFD gives priority to projects that focus on this matter, including the development of, for example, new labour market structures, new management systems, digital tools, etc., targeting this kind of employment. Finally, there is also a need for exploring and testing how recent graduates, migrant workers, and people with special needs are best integrated into the workplace. Entrepreneurship may play an interesting role in this.
3. Educational needs and new learning demands

IFD regards education as an investment – in society as well as in the individual. There is, however, a considerable uncertainty about the labour needs of the future. Reports point at the need for an educational system with a much wider educational scope, depth, and variation than today. One challenge is to ensure a match between supply and demand, as well as a fast introduction into the labour market at the end of one’s education. This sets new and stricter demands on: the educational system to deliver more structural flexibility and up-to-date technology systems; the teaching staff to work with modern tools in their teaching; and children and young people to take responsibility for designing their own education and navigating between several institutions and their various offers of education and learning models. New structures in the educational system may prove necessary.

Pedagogical tools

Supporting children and young people in becoming strong citizens with the necessary life skills through day care and education, is a key task. Skilled educators and teachers are essential prerequisites for developing mentally robust and academically strong children and youngsters. To this end, a coherent pedagogical effort working with the 0-18 year olds is pivotal, not least for vulnerable children and young people, and it would be of great value to have the impact of such effort assessed. Similarly, IFD is interested in projects and research targeting early intervention, for example projects that explore and develop educational tools for pre-school-age development in order to help children with, for example, cognitive, language, social, and/or motor difficulties, such that the transition between day care and schooling becomes as smooth as possible. This includes projects that explore the needs of children with special abilities, with a focus on the development of specialised didactics and a better inclusion of these children. Projects looking at the development of novel pedagogical tools, improved day care and educational institutions, and management skills, may help develop professionals that are up-to-date and ready for the future, thus ensuring that Denmark has trained, motivated children and young people with the necessary life skills to – in time – take over in our society. Moreover, there will be a strong demand for novel ways of thinking in innovative terms. IFD is therefore interested in research projects that explore how the educational system may develop pupils/students that think innovatively and have a personal strive for entrepreneurship, as for example setting up their own business, including research in learning spaces that promote digital teaching, innovation, and the development of new skills.

Learning, learning demands and learning strategies

Modern society does not just set new learning demands for educators, teachers and their managers, but also for the pupils. The so-called ‘21st Century skills’ describe the skills considered necessary for a well-functioning life in future society. The Danish ‘Fælles faglige mål’ (FFM)
setting common academic goals for pupils up to year 10 (Folkeskolen), aim at strengthening the pupils academically, socially, and culturally for a life in a changing society. The demands are stronger than ever for new skills and greater adaptability requiring that the pupils build efficient and flexible learning strategies that may help them develop skills and new areas of competence throughout their lives. This raises issues about how to conduct teaching in such a way that the pupils are given the opportunity to develop these skills individually and in groups, about which learning strategies prove the most efficient for children and young people when preparing them for a still increasingly changing world, and about which didactics and technology will be best in supporting children and young people in their development.

Social and ethnic integration continues to be a challenge in education. For example, anxiety and isolation is a growing factor among children and youngsters. Also young people from ethnic minorities, in particular boys, generally have lower marks and a higher educational dropout frequency than those of Danish ethnic origin. IFD is interested in giving particular attention to inclusion and to exploring which pedagogical and didactic efforts are most successful in including more young people releasing their potential. This also covers projects that want to increase social mobility, not least among children of non-Danish ethnic origin. IFD is also interested in additional research into practice-based teaching in primary education (combining theory, practice, and application-oriented teaching), in open schooling and democratic education, outdoor schooling, movement, and ‘flipped learning’. This in order to develop a strong knowledge-based foundation for determining which methods and didactics improve the children’s skills, ensure the best possible welfare, and increase social mobility. Similarly, IFD is interested in projects that explore the impact of the latest school reform (Folkeskolereform 2014). Combined with an analysis of teacher training, such projects may possibly provide insight and recommendations for improvement, as for example proposals for new structures in teaching, number of lessons, new subjects etc.

**IT-based teaching**

It is important to explore in which ways digitalisation, Artificial Intelligence, and robots may contribute to solving the challenges facing the educational system in way of developing new skills and with regard to the issues of inclusion in and dropout from education. IFD would like to see projects with controlled teaching trials including, for example, robots as teaching assistants, development of both pupils’ and teachers’ ability to work with robots, and game-based learning and coding. The aim could be to inspire girls to develop IT-skills, to integrate vulnerable pupils, or to increase pupils’ learning motivation, but also to identify new potential in pupils and in new technology with a view to develop novel digital products. Distance learning may also be a topic for exploration, in as much as it would be expected that better opportunities in this area may diminish dropout rates and ensure higher level of education in peripheral areas.
3. EDUCATIONAL NEEDS AND NEW LEARNING DEMANDS

Dropout

About 8% of a class year of young people have no affiliation with the labour market and no education. The derived yearly costs of this are thought to be DKK 12-15 billion, not to mention the individual challenges facing the young people themselves. Many of these young people have started in education, but then dropped out. Dropout rates are far too high, in particular within vocational training, but dropout as well as lack of education and work, have multiple explanations, among others social and/or academic failure in the years of basic schooling. These youngsters need individual solutions and specific actions involving someone that will help them find out what they want to do and what they can do. This group also includes a growing number of young people with no academic or social issues. Some may have failed due to growing performance pressure, while others have been diagnosed with a personal disorder on their way towards an education or a job and now need help to gain control in other parts of their life. Another possible reason for dropout is that many pupils lack the academic prerequisites to complete their schooling. Other reasons are, for example, lack of trainee and apprenticeship positions, housing problems, and personal crises that may contribute to a process leading to an eventual dropout. IFD is interested in projects that will provide solution-focused knowledge about the fragile youngsters by, for example, connecting businesses and the educational institutions where the potentially vulnerable young people are or would like to be.

Projects identifying the most suitable didactic methods for teaching within vocational training, including developing and testing specific programmes focusing on retention through physical communities and distance learning, will be of interest to IFD. The aim is to minimise dropout rates and halt processes leading to eventual dropout.

Continuing education and master degrees

Dropout is also an issue within high school, college, and university education. IFD is interested in research projects that explore the reasons for dropout and develop interventions that may prevent dropout in continuing education. Furthermore, priority is given to projects that, for example, explore research-oriented vs. practice-oriented master degrees in university, integration of digital learning models and/or distance learning in continuing education and master degrees, as well as develop models of collaboration between research institutions and businesses that develop novel career paths and opportunities for young scientists, in particular within disciplines in social sciences and arts.

Lifelong learning

Continuing education during both youth and adulthood is crucial for the continuous development of skills and lifelong learning. IFD would like to see projects that explore, develop, and support reskilling and training for specific jobs in specific sectors, as well as projects that develop business-oriented courses for specific groups of people in which models for both reskilling and collaboration between the individual educational institution, trainee/apprentice/employee, and business show potential for scalability.
4. The public sector and innovative measures

An efficient public sector is crucial if we are to ensure high productivity and general economic growth in Denmark – and innovation is important if productivity, efficiency, as well as quality is to increase. It is expected that user and citizen involvement and employee-driven innovation may increase productivity in public sector services by focusing more on how the impact of these services is perceived by the citizens, by giving employees more freedom regarding how to deliver public services, by ensuring clear management, etc. Development of new organisational and management models that ensure a citizen-oriented, dynamic, and adaptable public administration is needed. Projects that employ new strategies, methodologies, and technology, and explore which of those have the most significant effect, for whom, and when, may strengthen the transition of public sector services towards a more efficient and productive sector.

Trust

The Danish society relies on a high level of trust between public administration, citizens, and businesses. A number of developments challenge this trust. IFD is interested in projects that focus on the relationship between citizens and businesses, on the one hand, and public administration, on the other, with a view to increasing citizens’ level of trust in the public sector delivering good and reliable case management, appropriate solutions, and a uniform administration. IFD welcomes projects that offer better solutions and are able to increase the level of trust between citizens and those exercising public authority through concrete measures for developing this relationship.

Data security

Data-driven management and data-driven innovation are viewed as key elements in the development of the public sector. The many central registers in Denmark are an advantage when it comes to research and innovation, but with an increased use of computer link-ups of registers and new ways of utilising data; our vulnerability to cyberattack and abuse of data is growing. There is a substantial need for increased security and better integration of existing IT-solutions in the public administration, and for a stronger collaboration through shared research and development projects that develop new solutions, development tools, and control methods that will also safeguard the citizens’ need for a respectful and safe dealing with data.

Health and innovation

Projects defining IFD’s priorities within the healthcare system are those including solution-oriented research focused on: early intervention and preventive measures; physical and mental health; transition between life stages or transition between primary and secondary care, e.g. ensuring better and more coherent care pathways; better integration of, among others, disadvantaged and new citizens; rehabilitation and telemedicine; special needs of the older generations. Due to differences in demography,
4. THE PUBLIC SECTOR AND INNOVATIVE MEASURES

for example ethnicity, age, accommodation, and the different properties of various both public and private service providers, it is often difficult to compare services in the public sector. Health-related projects that work with models for developing generalisable data and qualitative and/or quantitative tests of these models will be of interest to IFD. Today health initiatives, such as interventions targeting specific illnesses, are able to integrate digital technologies in new ways and involve citizens and businesses as a resource in the development and delivery of public services. This trend is expected to continue and reflects the need for broader research into the growing digitalisation within healthcare. IFD prioritises prevention projects that involve not only new ways of integrating digital tools, but also a high degree of citizen involvement in the development and test of these interventions.

**Risk factors for children and young people**

As mentioned under topic 1, we have for some time seen a worrying development in the welfare of children and young people. IFD prioritises projects that contribute to minimising this development. There are several programmes working to prevent poor mental health, but there is little knowledge of their impact. Universal prevention programmes targeting all or specific groups within the population, regardless of risk factors or risk behaviour, generally show little or moderate effects, but due to the fact that they include a large number of people, they may still prove relevant and cost effective. IFD finds the following topics to be particularly relevant for a more solution-oriented research into the welfare of children and young people, not least young people from ethnic minorities: Adverse life conditions due to violence and abuse; digital abuse; strong increase in diagnoses and medication; young people experiencing stress; eating disorders and self-harm; suicide and suicide attempts; isolation. In several of these topics it is important to include a gender perspective.

**Welfare for the elderly and new technologies**

It is particularly relevant to include elderly citizens in the development of innovative technology and products that offer new opportunities of e.g. better and faster rehabilitation, a higher degree of independence, etc. This is due to the fact that the end users of this technology and those products will often be elderly people. Although several more products for, for instance self-diagnosis will be developed in the future without targeting specific age groups, a lot of this technology is clearly aimed at elderly people, serviced residences, and care homes, including those caring for people with dementia. Within welfare technology, IFD prioritises projects that may lead to potentially large savings and considerable improvement, as well as a tangible and measurable improvement of quality of life for the users. Furthermore, the projects are expected to closely involve both the employees in eldercare and the elderly citizens in developing and selecting products. Similarly, IFD gives priority to projects that integrate and exploit data in the development of better quality of life for the elderly, regardless of whether they live in their own home or a care home.
5. CONSUMPTION AND INDIVIDUALISATION

5. Consumption and individualisation

Consumption cuts across the four fields below: Business-to-Consumer, services, design, and tourism. Hand in hand with a trend towards growing individualisation and digitalisation, consumption is central in those fields. Increased individualisation and digitalisation do, for example, entail that consumers, users, and shoppers require more of their service providers and the quality of the service they get. For each of the four fields, IFD has defined topics with a potential for innovation.

**Business-to-Consumer**

The general increase in prosperity means that people use a larger share of their salary on goods, services, and experiences that have social and narrative value rather than purely functional use. In order to engage more closely with the users, deliver more valuable products, and generate higher earnings, manufacturers and service providers use storytelling and storytelling techniques in creative ways to match the end user’s needs. Similarly, they may see an advantage in exploring how and when technology is of real value to their users. It is expected that it will predominantly be the users that determine the conditions governing the interaction in e.g. online shopping, and that supplier and brand loyalty cannot be taken for granted.

IFD is also interested in projects that are able to work with novel, possibly sensory, aspects of products and experiences and with new ways of user involvement, and are able to organise and develop new business models. This includes projects that involve rethinking the physical store in combination with online shopping, with a possible focus on developing new digital tools to help employees by, for example, integrating sales channels and establishing a new holistic experience for the costumer, regardless of whether they shop online or in the physical store. IFD welcomes projects that exploit salient technologies of the future and use those in developing new products and services in which the customer is a co-creator.

**Services**

For many years the operational service sector, i.e. cleaning, temporary work agencies, laundries, canteen/catering as well as security, has seen major growth and a large increase in the numbers of employees. Service businesses are often susceptible to customer wishes and needs and thus continuously establish new lines of business when identifying new needs. In line with growing automation and the digital platform economy, new business services are expected to develop, such as Internet-of-Things based service providers with unique sensor knowledge, temp agencies with highly qualified staff, research and development service providers, businesses based on the principle of share economy, etc. It is estimated that the close relationship between service providers and customers could be exploited more efficiently, not least through a wider use of digital and more efficient planning tools.
The development within automation, IT, and advanced manufacturing technology opens for new manufacturing opportunities in Denmark, but does at the same time increase demands for knowledge and highly qualified staff. The manufacturing industry will therefore depend on businesses that provide high quality services. Business models that succeed in meeting these needs will be important, but there is a lack of development and testing of such models.

Both the service and manufacturing industry may obtain real customer insights by using Artificial Intelligence. Algorithms may give insight into customer demands in a way to help businesses make smart choices regarding the ‘whats’ and ‘hows’ of production, communication, and/or sales. By using Artificial Intelligence in manufacturing and in retail, it is possible to obtain detailed knowledge that can be used in production and order handling as well as in gaining genuine insight into customer demands. Not enough small and medium-sized businesses are, however, entering into the digital transition, and IFD would like to see projects that may help meet this challenge and, in collaboration with different, relevant stakeholders, develop models of wider interest and thus facilitate digital transition in both public and private sectors.

Design

Danish design, and Danish architecture, are internationally renowned for their high quality when it comes to design, aesthetics, sustainability, and materials as well as to professional designers/architects. The “New Nordic”-movement has created an interest that has further increased the demand for Danish design, a trend that is expected to continue. It seems obvious to further exploit this particular position of strength within design and architecture. This could be done by copying values and design principles to entirely different disciplines, or build on other fields in new ways by, for example, working systematically with design inspired by nature (biomimetics) and the senses. By expanding the sensory aspects in products, new dimensions may be added to products and goods. Design is expected to also play an important role in the transition towards a more sustainable society in way of both actual design contributions and more jobs. Similarly, ‘design thinking’ may become a key method for businesses to optimise their product development processes and enable new ways of working with user needs and behavioural changes. IFD welcomes projects within the field of design that rely on research-based knowledge and, by applying a solution-oriented focus, wish to: improve living conditions in general and, more specifically, through e.g. hospital health design, intelligent textiles, and healthy housing; facilitate sustainable transition processes in society; offer new opportunities for industry through a novel design approach; replace existing products with sustainable design solutions; develop new products or design strategies based on biomimetics. Co-creation involving citizens and users with a special interest in re-design or entirely new design, is expected to be part of these projects.

Design of large service systems may play a role in the transition towards a more climate friendly society, in as much as system design involves
5. CONSUMPTION AND INDIVIDUALISATION

planning and organising people, infrastructure, communication, and media, all of it part of any service and necessary in order to improve quality and develop and/or change ways of interaction between provider and customers to optimise customer experience or behaviour. System design as a means of promoting sustainability in an entire sector, e.g. construction, may turn out to be necessary, not least in order to integrate resource optimisation in circular economy. The construction industry may gain from promoting the development of sustainability in all construction work, not only when dealing with selected materials. IFD is interested in projects concerned with new business models in construction involving all its various stakeholders, as well as with new approaches to training and education that will promote sustainable construction and innovative, healthy housing through, for example, further developing care homes, novel ways of living across generations, and solutions that approach the need for new urban housing from a new perspective.

Tourism

IFD’s Investment Strategy for Tourism, 2016, is still valid, and the following is thus an add-on. The field of tourism is still expected to be an important growth sector. Shared economy systems, like for instance AirBnB, a wider knowledge of eco-tourism, and more digital tools giving the tourist the opportunity to obtain local information, have added to the general trend in today’s tourism where tourists look for authenticity e.g. in meeting and conversing with the local population. While coastal and urban tourism were earlier seen as being strictly separate fields by the tour provider, tourist demands now move towards package-solutions that include the whole country and make it possible to enjoy various kinds of authentic experiences. Projects that try to develop, offer, and organise new experiences through involvement of, for example, volunteers with an interest in culture, will be considered relevant. This includes projects that test different ways of gathering data and the usability of data sources, with a view to offer specific business intelligence input. An increased use of digital platforms, a coupling of data sources and programmes that show tourists’ patterns of movement, among other things, may contribute to a wider knowledge of tourists and their preferences. These real-time data may be used in a dynamic optimisation of the tourists’ experiences and their stay, as well as in actual product development.

The need for levelling seasonal variation in tourism requires a new, innovative approach and the identification of niche segments among tourists for whom the travel and stay is not driven by seasonal requirements, but by interests. The increase in the numbers of people interested in active tourism is expected to continue, thus opening for new opportunities of combining nature and culture experiences in peripheral areas. IFD welcome creative projects within tourism that will boost research in this field by, for example, working systematically with big data and scalability, launching new projects in peripheral areas, testing methods for scalability, and developing business models for new ways of combining urban, costal, and business tourism.
The strategy for the Future Society
- not an exhaustive list

The purpose of IFD is to facilitate the translation of research-based knowledge, societal challenges, and innovation needs into specific projects, partnerships, and solutions. These should eventually create socio-economic value for Denmark through mobilisation, education and training, as well as a better exploitation of the work force in general and the pool of available talent in particular. IFD invests in entrepreneurs, scientists, sectors, and businesses that have the knowledge, the will, and the ideas to ensure this value creation and make a positive difference. Based on interdisciplinary collaborations, IFD investments should both increase the level of innovation skills and achieve tangible and measurable improvements within the partnering organisations through, for example, use of technology. The present Investment Strategy is IFD’s recommendations for selected key societal challenges and potentials of the Future Society. Examples of key challenges are described under the five main topics, but this investment strategy is by no means an exhaustive list of all societal challenges. IFD always welcomes proposals for innovative research projects that may contribute to the solution of the various challenges facing society – including challenges within other areas than those mentioned here.

Literature
The Investment Strategy for the Future Society from Innovation Fund Denmark is based on the IFD’s legal framework, data from Statistics Denmark, various analyses and reports from among others VIVE (The Danish Center for Social Science Research), SIRI, EU, UN, The Council on Health and Disease Prevention, The Danish Productivity Commission, The Danish Welfare Commission, UNESCO, The Rockwool Foundation as well as other relevant national strategies. Furthermore, valuable input for the strategy has been obtained by meeting with scientists, organisations, civic society stakeholders, and through the work on RESEARCH2025.
Five examples of IFD investments

Get inspired by five investments exemplifying IFD’s activities within Trade, Services and Society.

Social challenges in society

THREAD is a 2.5-year project aimed at ensuring job creation, independence, and involvement among refugee women through a new model of integration based on a shared interest in fashion, textiles, and textile craftsmanship. Danish businesses specialised in fashion and textiles, for example Henrik Vibskov, engage refugee women in internships and thus introduce them to the Danish labour market. At the same time the businesses gain new knowledge and skills from the refugee women within craftsmanship traditions, consumer behaviour, and fashion in the Arab countries that are a growing market for Danish business.

Furthermore, the women are to collaborate with Albertslund Vikingelandsby (the Viking village in Albertslund) and FAKTI, an association working with refugee and immigrant women, in establishing shared sewing workshops and developing clothing design, and to participate in the training of teachers as well as research activities at both Centre for Textile Research at the University of Copenhagen and Design School Kolding.

Labour market and working life

LISES is a 4-year research project carried out by Aalborg University in close collaboration with KL (Local Government, Denmark), Gladsaxe, Herning, Holstebro, Silkeborg, Vesthimmerland, and Aarhus municipalities. The project focuses on increasing labour market participation among the most vulnerable unemployed. The aim is to develop new and innovative solutions to the employment challenge, as well as the implementation and testing of those solutions within the duration of the project. Contrary to a lot of research in this field, new knowledge is achieved through the collaboration between the research group from Aalborg University and managers and employees in the municipalities using specially developed learning platforms.

The project aims at developing new management models for the public sector that documents the meeting between the system and the citizen, exploits the opportunities obtained by seriously involving the citizens, and enables the parties to include employer expectations and involvement in the employment effort.

Educational needs and new learning demands

GBL21 – Game-Based Learning in the 21st Century – is a 5-year research project studying 40 schools and how they use analogue and digital gaming tools to develop pupil skills such as collaboration, communication, creative thinking, and problem solving. These skills are particularly important in the 21st century as they play a major role for how the pupils may qualify for an active participation in the society of the future.
FIVE EXAMPLES OF IFD INVESTMENTS

game-based learning pathways are developed in close collaboration between Aalborg and Aarhus Universities, learning consultants from The National Centre for Reading and the university colleges UCC and VIA, and developers from the companies Build A World, digital publishing house CLI Online, and UVdata.

GBL21 is tested in the disciplines Danish, mathematics, and science with strong support from the teachers through all stages of the project. The teachers thus get the possibility of gaining experience in the use of gaming in their teaching while also reflecting with colleagues and consultants on the didactical potential and challenges entailed. Measuring impact by use of advanced tests is part of the project.

The public sector and innovative measures

SDU Robotics is the lead in SMOOTH, a 4-year research project that aims to develop a robot specifically targeted care homes. In collaboration with Køge Municipality, Technological Institute, and the companies Robotize and Dictus, SDU scientists will develop a state-of-the-art service robot. The robot should eventually be able to take over routine work, giving the care workers more time to engage in meaningful activities with the elderly. The robot will, among other things, accompany the elderly to the dinner hall and be able to carry washing and garbage. There is a demand for reducing the practical work load so that care workers may spend more time with the care home residents and have more time for activities and training to benefit the residents and increase their welfare.

The challenge in developing welfare robots is to make the interaction between humans and robot reliable. The project develops models for human ways of acting and reacting by studying closely how, for example, people place themselves in a room.

Consumption and individualisation

Rethinking Tourism in a Coastal City – RTCC – is a 3-year research project about increasing demands from tourist today for new experiences and cultural events in coastal towns. Danish coastal towns have a huge potential for attracting guests in the future. Therefore, Ringkøbing-Skjern Municipality, in collaboration with scientists from Aarhus University and Aarhus School of Architecture, has set up a project that will rethink coastal tourism through the development of interventions that activate local citizens and tourists. The project involves experts on tourism from Danish Coastal and Nature Tourism, VisitAarhus and NaturKraft, a future adventure centre in Ringkøbing.

The RTCC-project will develop experiences for local citizens and tourists based on an understanding of nature and culture as fundamentally interlinked. The project intends to create new links between tourists, local citizens and locations. The municipality is turned into a living lab where scientists, in collaboration with local citizens and tourists, develop and test new ways of tourism in rough landscapes, coastal towns, and historic locations like the bunkers on the seafront.