DIRECTORATE FOR EDUCATION AND SKILLS

COLLABORATION, ALLIANCE, AND MERGER AMONG HIGHER EDUCATION INSTITUTIONS

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Abstract

Declining student numbers; growing fiscal pressures; and intensified international competition for prestige, research talent and funding, have increasingly made collaborations, alliances, and mergers among higher education institutions a priority for institutions themselves, and for the governments that support them. Collaborations, alliances and mergers among higher education institutions may seek to enhance academic performance, to achieve economic efficiencies, or to better align the network and performance of institutions to public needs. Institutional collaboration occurs less frequently and successfully in the design and delivery of instruction than in other domains, owing largely to the traditionally autonomous and solitary role of faculty in this area. Collaboration is much more common in research, engagement, and back-end administration and other supports, with research collaboration often offering the greatest performance gains, and administrative collaboration the greatest potential efficiencies. Targeted grants are the most common tool governments use to encourage institutional collaboration and consolidation, while more flexible quality assurance standards and the greater alignment of policy frameworks more generally can also make it much easier for institutions to collaborate. Evidence about the outcomes of collaborations, alliances, and mergers is limited, but indicates that these initiatives can strengthen institutional performance, produce efficiencies, improve resilience and enhance alignment to national priorities, although not for all institutions in all circumstances. Policymakers who succeed in promoting effective collaboration appear to strategically stimulate institutional initiative, support effective planning and implementation, secure stakeholder buy-in, concentrate resources, and achieve policy alignment.

Résumé

De plus en plus d'institutions d'enseignement supérieur, ainsi que les gouvernements qui les régissent, favorisent la collaboration et la consolidation institutionnelles face à la réduction de la demande étudiante, le durcissement des contraintes fiscales, et l'intensification de la concurrence internationale pour le prestige, le talent et les flux de financement. Les collaborations, alliances et fusions peuvent chercher à améliorer la performance académique, réaliser des économies, ou aligner des activités institutionnelles aux besoins de la société. Dans l'enseignement, la collaboration est moins fréquente et réussit moins souvent que dans d'autres domaines d'activité institutionnelle, en grande partie du fait de l'autonomie et de l'isolement traditionnel des enseignants dans le supérieur. La collaboration avec partenaires externes est de loin la plus fréquente dans les domaines de la recherche et de la coopération. Elle semble offrir le plus grand potentiel de gains de performance dans la recherche, tandis que dans l'administration elle est plus prometteuse en termes de réalisation d'économies. Pour promouvoir la collaboration et la consolidation institutionnelles, les gouvernements se servent le plus souvent de mesures de financement ciblées, bien que des systèmes d'assurance de la qualité et l'alignement des différents cadres administratifs et politiques puissent également jouer un rôle facilitateur essentiel. Jusqu'à aujourd'hui, les résultats tangibles d'initiatives visant à développer les collaborations, alliances et fusions demeurent limités. La littérature suggère que ce type d'initiative peut renforcer la performance et la résilience institutionnelles, faire réaliser des économies, et améliorer l'alignement des activités des institutions sur les besoins de la société, mais ces objectifs ne sont certes pas réalisés dans tous les cas. Il semble que les initiatives gouvernementales qui réussissent le mieux dans ce domaine stimulent l'initiative institutionnelle, appuient les institutions dans la planification et la mise en œuvre des mesures, garantissent l'adhésion des parties prenantes, concentrent les ressources de façon stratégique, et alignent mesures et règlements pertinents à ces objectifs.

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Acronyms and abbreviations

AUD	Australian Dollars
ACE	American Council on Education
CAD	Canadian Dollars
CAE	College of Advanced Education
CAM	Collaborations, Alliances and Mergers
CC	Creative Commons
CCC	California Community College
CEAI	Center for Education Attainment and Innovation
CEI	Campus de Excelencia Internacional
CIHR	Canadian Institutes for Health Research
COMUE	Communauté inter-académique d'universités et d'établissements
CRN	Collaborative Research Networks
CSU	California State University
EFTSU	Equivalent full-time student units
EHEA	European Higher Education Area
ESG	Standards and Guidelines for Quality Assurance in the European Higher Education Area
EU	European Union
EUA	European Universities Association
EUR	Euros
FE	Further education
GBP	British Pounds
GRI	Government Research Institute
GW	Government of Wales
HEA	Higher Education Authority
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
ICT	Information and Communications Technologies
IdEX	Initiative d'Excellence
IMOS	Integrated Marine Observing System
IoT	Institute of Technology
JARA	Jüluch-Aachen Research Alliance
LCU	Legea consorțiilor universitare

LEN	Legea educației naționale
MEXT	文部科学省 Ministry for Education, Culture, Sports, Science and Technology
MIT	Massachusetts Institute of Technology
MOOCs	Massive Open Online Courses
NIC	Norwegian Innovation Clusters
NCRIS	National Collaborative Research Infrastructure Strategy
NZD	New Zealand Dollars
OER	Open Educational Resources
PIA	Plan d'investissements pour l'avenir
PRES	Pôle de recherche et d'enseignement supérieur
QA	Quality Assurance
R&C	Reconfiguration and Collaboration
RCT	Randomised control trial
RDD	Regression discontinuity design
SDF	Strategic Development Fund
UAS	Universities of Applied Sciences
UC	University College
UCalifornia	University of California
UK	United Kingdom
US	United States
USD	United States Dollars
USG	University System of Georgia
UW	University of Wales
WHW	Wet op het hoger onderwijs

Executive summary

Higher education institutions may undertake collaborations, alliances and mergers with the aim of enhancing academic performance or achieving economic efficiencies, or from the government perspective especially, to help better align systems with the needs of the public. In many contexts, inter-institutional integration and affiliation are among the only feasible pathways to consolidate higher education institutions, departments or programmes.

This Working Paper is an output of an OECD project to support public consultation and strategic planning by Finland's Ministry of Education and Culture. The project placed a special emphasis on instruction-related activities, as this is an area where across the OECD collaboration between different higher education providers has traditionally been less developed, despite the range of benefits such collaboration might offer.

This paper mainly presents the findings of a literature review on policy initiatives to promote institutional collaboration and consolidation in higher education, which considered 170 sources collected and consulted from June to September, 2017, examining the experiences of 19 national OECD or EU jurisdictions in particular. The paper also draws upon the project's other major component: studies by international experts describing national experiences in three OECD jurisdictions. Its findings illustrate the types of collaboration and consolidation initiatives higher education institutions pursue, as well as their results, the policy instruments governments use to promote them, and the strategic challenges to which they must respond.

Studies of higher education collaboration and consolidation focus disproportionately on less numerous research universities rather than more numerous non-university tertiary institutions (such as polytechnics or universities of applied science), and postsecondary non-tertiary institutions. Research likewise focuses more often on mergers than alliances and collaborative agreements, though the latter are likely to be more common.

Promoting collaboration and / or consolidation among higher education institutions appears to be an increasingly important priority for governments. Every jurisdiction examined in this review was pursuing initiatives in this area or had done so recently. Governmental initiatives to intensify collaboration and consolidation are spurred by demographic changes, fiscal pressures and intensified international competition for prestige, talent and research funds.

Based on limited evidence, the outcomes of collaboration and consolidation initiatives are mixed and variable. Initiatives can strengthen institutional performance, produce efficiencies, improve institutional resilience and enhance institutional alignment to national priorities; however, they do not consistently achieve these aims. To be fruitful, initiatives must correctly target the desired goals, fit the institutional and systemic context, and be implemented effectively.

Expanding institutional collaboration and consolidation is often complex and difficult, and spurs conflict within higher education institutions and among their external stakeholders. Policymakers who succeed appear to strategically stimulate institutional initiative, support effective planning and implementation, secure stakeholder buy-in, concentrate resources, and achieve policy alignment.

Institutional collaboration is least common and least successful in the design and delivery of instruction, owing largely to the traditionally autonomous and solitary role of faculty in this area. Collaboration is much more common in research, engagement, and back-end administration and other supports, with research collaboration often offering the greatest performance gains, and administrative collaboration the greatest potential efficiencies.

Advances in information and communications technologies are creating new opportunities and new pressures for collaboration in instruction, however. These new modalities may shift faculty towards greater teamwork in the development and delivery of courses, although scale appears necessary to achieve efficiencies while strengthening student learning through online instruction and open educational resources.

Among higher education institutions with legally differentiated missions or roles, governments pursue very different approaches to collaboration and consolidation. In some jurisdictions, such as the Netherlands, a policy of sharp binary differentiation emphasises collaboration among institutions of the same legal form, whereas in others (e.g. Flanders) public policy has strengthened ties more across different institution types than within the sectors.

The most common tool for governments to encourage institutional collaboration and consolidation are targeted grants. Governments often provide these grants an ad hoc basis, or through multi-year competitive innovation funding programmes. Setting greater conditions for institutions to receive regular funding may be most effective in promoting less intensive forms of collaboration, such as the development and use of open educational resources.

Greater alignment of the regulatory frameworks in which institutions operate, including more flexible quality assurance standards, can make it much easier administratively, academically and politically for institutions to collaborate. In many jurisdictions, there remains considerable scope for reducing legal and regulatory barriers to collaboration.

1. Introduction

This Working Paper presents the findings of a peer analysis by the Policy Analysis and Implementation Division of the OECD's Directorate for Education and Skills. The project offered support to an advisory group convened by Finland's Ministry of Education and Culture (Opetus- ja kulttuuriministeriö, OKM) to prepare a strategic plan for higher education to 2030. The purpose of this peer analysis was to better understand policy approaches to institutional collaboration and consolidation in higher education across the OECD and identify and understand the potential implications of different policy options. The review focused especially on the instruction component of institutional missions, and sought to take into account the influence of information and communication technologies on how higher education providers collaborate.

The Working Paper builds upon the literature review component of the peer analysis, which had two primary objectives: 1) to provide an overview of institutional collaboration initiatives in higher education across relevant jurisdictions and 2) to summarise trends and findings in the academic literature regarding relevant policy instruments and strategies, and the effects of collaboration and consolidation initiatives. The review ultimately considered evidence on national experiences from over 170 sources, which were collected and consulted from June to September, 2017.

Part 2 provides a framework for the analysis of institutional collaboration and consolidation, identifying types of initiatives in which institutions engage, discussing mergers specifically and then addressing collaboration in different domains of activity, focusing especially on instruction and the implications of new digital technologies. Part 3 examines the evidence of impact of collaboration and consolidation, including risks. Part 4 examines why governments intervene to promote inter-institutional collaboration and consolidation and then the policy tools that governments use. Finally, Part 5 examines strategic challenges faced by governments in successfully promoting collaboration and consolidation.

Annex A provides brief policy profiles of collaboration and consolidation initiatives. The policy profiles of Japan, the Netherlands and the US states of California and Georgia summarise case studies prepared for the peer review project by national experts. Annex B profiles policy approaches to online learning and open educational resources, with a special emphasis on the experience and evidence collected in the United States. Combined, these policy profiles highlight experiences from 17 national jurisdictions and more sub-national jurisdictions, which inform the analysis of the preceding chapters.

2. Collaboration and consolidation: What they are, where they occur

2.1. Defining terms

The most inclusive definition of institutional *collaboration* is any activity where institutions choose to co-operate in pursuit of goals that they judge they could not accomplish on their own (Lang, 2002). *Consolidation*, i.e. concentrating and often reducing academic and/or administrative capacity and expenditures, is such a common goal for collaboration that the two terms are sometimes treated as synonyms (Hawks, 2015).

The Higher Education Funding Council for England (HEFCE) provides a useful framework for categorising institutional collaboration and consolidation initiatives: a continuum of collaborations, alliances and mergers (CAM) (Bennetot Pruvot et al., 2015; HEFCE, 2012). To help clarify what collaboration is, the paper builds upon this construct in Figure 2.1 with an additional category of lower intensity activities called *networks*, which are too ubiquitous and informal to be of interest for this project (in Fraser et al., 2015). Collaborations, alliances and mergers between higher education providers may all aim, to different degrees, to consolidate activities in different institutions to create more coherence between them. The term *consolidation* is thus frequently used to describe different CAM initiatives.

Figure 2.1. The Networks-Collaborations-Alliances-Mergers Spectrum

Networks	Collaborations	Alliances	Mergers
Connections between individuals within institutions, or between institutions, with little or no leadership involvement, generally informal communication, and no change to organisational autonomy.	Arrangements between institutions (rather than individuals), embedded in formal agreements or partnerships.	A more extensive form of collaboration that covers a wider range of operations.	At least one institution ceases to exist as a legal entity through incorporation within an existing or new institution.
	May involve sharing of legal rights and privileges, human resources, physical space, equipment and technology, or information.	Partners share a wide scope of capacities, but retain separate identities and legal statuses, and agreements are revocable.	The original components of the merged entity may retain distinct names, brands, governance and operations to varying degrees.
Example: The US Distance Learning Association	Example: The Hamburg Open Online University	Example: The Barcelona Knowledge Campus	Example: The University of Manchester Merger

CAM all have important legal dimensions, and these vary in their exact detail between countries (Stanfield, 2011). This definition of mergers is inherently tied to institutions' legal status, but the principal legal instruments for institutional collaborations and alliances are 1) contractual agreements, and 2) the establishment of jointly owned or governed legal entities. In many countries, for example the United Kingdom, contractual

agreements are straightforward, flexible, and quick to establish. Joint legal entities can better limit liability, better attract funds, enjoy favourable tax treatment, build clear structures for joint governance and ownership, and allow hiring of staff and student engagement separate from prevailing conditions at the partnering institutions; however, they are costlier in time and money to establish, impose additional legal obligations, and create irrevocable changes in mission and structure.

CAM differ in breadth, centrality to mission, and depth. The more intensive a CAM initiative across these dimensions, the more it compromises the partners' autonomy and the more likely it is to reshape the institution's mission. Yet, CAM may affect different sub-units within an institution differently. For example, comprehensive institutions that develop a joint programme of study are engaged in a collaboration that is narrow (affecting only one programme), but arguably deep and highly central to higher education's core teaching activity. In contrast, where central administrations have limited influence on faculties and departments, mergers combining institutions may integrate governance bodies and support services, but only affect central teaching and research activities in a limited fashion (de Boer, 2017). Federation mergers differ from unitary mergers in that the original institutions may retain separate governing bodies and other governance structures (Association of Colleges, 2016a; HEFCE, 2012).[1]

The least intensive forms of CAM are practically ubiquitous, while more complex forms of CAM, such as mergers, occur less often. Despite improvements in information and communication technologies (ICT), proximity continues be closely correlated with density of collaboration even for non-intensive activities such as co-authorship by individual researchers (Gazni et al., 2012; Larivière et al., 2015). Where CAM occur across greater distances they are often less intensive, recognising costs involved in co-ordination and greater differences between entities, even though mergers can create multi-campus institutions.

The remainder of this section reviews recent international trends in mergers in higher education, before examining in more depth patterns of alliances and collaborations in teaching and other domains of institutional activity.

2.2. Mergers

2.2.1. Frequency of mergers

The consolidation of tertiary education institutions through merger occurs with great frequency across the world. From 2000-2015, the European Universities Association (EUA) recorded 93 university mergers that significantly restructured higher education provision across many of its 47 member countries (Bennetot Pruvot et al., 2015; EUA, 2017). Mergers among non-university higher education institutions in Europe appear not to be comprehensively recorded, but there is no doubt they have been even more widespread (Harman and Harman, 2003). In five relatively small Western European jurisdictions alone (Finland, Flanders, the Netherlands, Norway and Wallonia), the number of polytechnic-type higher education institutions fell from 841 to 157 between the 1980s and the mid-1990s, overwhelmingly as a result of mergers (Kyvik, 2004). More recently in the United Kingdom, England's complement of further education (FE) institutions fell by 156 (over 30%) between 1993 and 2014, Northern Ireland merged 16 colleges into six in 2007, Scotland reduced its complement of FE colleges from 37 to 20 from 2011-2014, and Wales has similarly reduced its number of colleges from 25 to 13 (Association of Colleges, 2016b; Iraci Capuccinello and Bradley, 2016). Among public or

private non-profit colleges in the United States (US), between 2000 and 2013 Russell (2017) records 144 mergers of 4-year colleges, 185 mergers of two-year colleges and 40 mergers of less-than-two-year colleges. These figures indicate that 9.3% of public colleges, 3.9% of private not-for-profits, and 11.6% of two-year colleges took part in mergers over the time period (the combined average is 6%). Furthermore, in 2015 Moody's predicted that the pace of institutional mergers was set to double (Askin and Shea, 2016). Mergers, primarily in 2003-04, helped to reduce Japan's complement of national universities from 100 to 87 (Yonezawa, 2017). In China mergers are also common, where more than 400 mergers involving 1 000 public universities have taken place since the 1990s, mostly between 1990 and 2005 (Cai and Yang, 2016).

Mergers of smaller often specialised institutions with larger often comprehensive partners may be referred to as absorptions or even acquisitions. Among universities at least, absorptions (often of non-university institutions) are much more common than combinations of similar sized institutions – "mergers of equals" appear to be very rare (Harman and Harman, 2003; Lang, 2002; Skodvin, 1999; Thomas, 2015).

Bennetot and Pruvot et al. (2015) identify system-level initiatives that directly reduce the number of institutions through conventional mergers, or bring institutions into federations and regional "hubs" with an overarching governing entity as *concentration measures*. European jurisdictions that have recently pursued concentration measures include Denmark, Estonia, Finland, Flanders (Belgium), France, Hungary, Norway and Wales. US states that have pursued dramatic consolidations include Wisconsin (1974), Minnesota (1995), Kentucky (1997), Kansas (1965-2008), Alabama (2015), Louisiana (2015), Texas (2015) and Georgia (2013-2017) (Russell, 2016). The Georgia policy profile describes this case in detail (Miller, 2017).

2.2.2. Purposes of mergers: advancement and survival

Among institutions that are financially vulnerable, merger is a survival strategy. In the United States, management consultants emphasise the small size of private institutions as a key indicator of risk to institutional survival, along with an absence of online programmes, swift tuition increases, high tuition discount rates, excessive tuition dependency, low endowment revenues, high debt payments, and deficit spending (Parthenon-EY Education Practice, 2016). Small institutions in particular are typically more "vulnerable to changes in their resource environment" than are larger institutions (Goedegebuure, 2012, p. 5).

Larger and more diversified institutions are better able to pool risks and maximise institutional flexibility to meet changing circumstances. Many risks are a product of weak governance and administrative capacity, or institutional rigidities that obstruct important changes if they disadvantage certain internal stakeholders. Consolidation therefore often seeks to strengthen institutional governance, professionalise management and thereby improve financial oversight, quality assurance (QA) and strategic planning.

Among financially healthy tertiary institutions, mergers are typically undertaken in pursuit of differentiation, performance enhancement, or in the expectation that greater size will yield cost savings through economies of scale (Lang, 2003). CAM of institutions with similar disciplinary profiles may seek to reinforce strengths (often in research or graduate studies) and/or reduce duplication, while those involving institutions with different profiles may pursue diversification or create interdisciplinary synergies.

Where consolidation is necessary, mergers or at least alliances are an alternative to simply shutting down departments or institutions with excess capacity. Pooling faculty can permit the maintaining of programmes or departments. Of course, CAM can still lead to the closure of campuses or programmes: for example, newly created multi-campus institutions often end up closing secondary rural campuses (Pinheiro and Berg, 2017; Zeeman and Benneworth, 2017). Still, closure processes may be less severe when pursued through CAM than would otherwise be the case, as integration in another institution can allow continuity of employment, the focusing of capacity reduction on areas of weakness while maintaining strengths, the continued optimal use of infrastructure and equipment, and overall provide a more positive and constructive frame for renewal.

2.3. Collaboration in teaching

Typically, teaching has more limited patterns of collaboration than research, external engagement and support services or administration. In the North American context, Stein and Short (2001) note that teaching "has tended to be solitary and less responsive to collaborative efforts" and in many colleges and universities it is "steeped in traditions that support both local autonomy and faculty control over the curriculum". This is antithetical to collaboration which demands giving up some autonomy. Thus, as Rothwell and Hebert (2015) observe, shared academic delivery is the least evolved collaboration activity in the United Kingdom across the areas they examine – much less so than administration and services.

While it may be difficult to achieve, there are grounds to assume that collaboration in instruction can help improve the quality of teaching and learning in many ways. Available literature suggests that, under the right conditions, CAM can:

- Expand course and programme offerings, allow specialisation in areas of strength, create new student pathways, and support new modes of delivery. Institutions can extend course offerings across the collaborating institutions, including often interdisciplinary courses, to offer programmes that better meet students' needs and interests.
- Permit institutions across binary divisions to combine distinctive and complementary strengths of professionally-oriented and theoretical instruction (Boggs and Trick, 2009; RMIT University, 2017).
- Permit co-ordination of faculty to allow individual professors to focus on instruction in their areas of greatest strength and facilitate their professional development (Dicenso et al., 2008).
- Create pathways to prepare and motivate students facing significant barriers (geographic, educational, economic, cultural, social, administrative, etc.) to enter and progress through higher education (HEFCE, 2012). Many collaborations seek to expand provision in underserved geographic areas, often by establishing shared campuses (Boggs and Trick, 2009; Flora and Hirt, 2010).
- Pool resources (financial, technical and other) for supporting new modes of instruction, such as online or experiential learning.
- Generate efficiencies through the elimination of redundant programmes and courses and increasing class sizes.
- Facilitate cross-cultural and linguistic experiences, especially internationally.
- Encourage more transparent academic recognition procedures, particularly in terms of international joint degree programmes (Cacheiro-González et al., 2013).

The following subsections review evidence from existing studies and analyses on: co-ordination and joint delivery of traditional academic programmes; the unbundling of academic activities; and the way technological developments are facilitating and driving co-operation between higher education providers.

2.3.1. Collaborations to co-ordinate and/or jointly deliver study programmes

Work by Stein and Short (2001) is especially useful to understand approaches to collaboration in instruction. This subsection will discuss these different approaches and then review the limited evidence as to their prevalence.

Approaches

In a baseline scenario without collaboration, institutions offer degrees in isolation and only consider other institutions' offerings to the extent that these compete with their own. The lowest intensity collaboration builds from this point largely on an ad hoc basis. Institutions may permit students to take courses at another institution and vice versa with credit accepted at home institution, but with the involved institutions retaining maximal autonomy and wholly independent degrees, as where many Japanese institutions rely on courses from the Open University of Japan to provide additional course options through online delivery, especially in language and general education fields (Yonezawa, 2017). Institutions may also pursue faculty and student exchanges on a similarly ad hoc basis.

From this point, formally cross-listing courses so that students can better organise their pathway towards a degree, or providing physical space for the delivery of another institution's programme where necessary to achieve a specific goal, can build greater structure into collaboration, with still limited implications for institutional autonomy. One example of this type of collaboration is university consortia in Japan such as the Consortium of Universities in Kyoto, which has fifty member institutions that share classes mainly in general fields such as "Kyoto studies". A similar initiative in the United States is the Southern Regional Education Board's Electronic Campus initiative, which provides a central portal to search through accredited credit-carrying online courses and programmes across 16 states (Miller, 2017).

Once institutions begin systematically sharing information and course credits in this way, they can take a leap towards greater co-ordination. This often involves joint planning to remove inefficient overlaps and maximise student options, but institutions may also more systematically share space, in terms of making use of each other's space to deliver programmes or developing new shared space.

Aside from co-ordination, the other direction for more intensive collaboration works towards joint delivery. To start, "networked curricula" can involve the establishment of shared programme structures, such as laddering that allows students to transition seamlessly from one education level to the next, including through articulation and progression arrangements where the credit achieved in one institution's programme contributes towards the awarding of a certificate by another (Cacheiro-González et al., 2013). In the United States and Canada, Floyd (in Boggs and Trick, 2009) identifies among the four prevailing models of college-university collaboration in teaching two laddering structures: bilateral articulation agreements designed to co-ordinate and govern the flow of students from two-year diploma programmes into the last two years of four-year university degrees; and multilateral or open articulation strategies, where a single university accepts two-year diploma graduates from select programmes into specific four-year degree programmes, with or without formal agreements with the sending colleges. In

such cases, institutions co-ordinate learning experiences, allowing them to be portable, but they retain independent responsibility for their separate components, even if the more senior party may provide some oversight. There is no conception of a joint enterprise, and institutions do not relinquish autonomy or control over course design, development and delivery or student assessment.

A slightly more intensive form of joint delivery that some still qualify as networked curricula involves integrated but independent qualifications from two or more institutions (QAA, 2015). These programmes may be jointly delivered, but help students meet distinct (though often overlapping) criteria and do not require that they satisfy requirements from all participating institutions to secure a credential from at least one. Programmes may offer a joint initial curriculum followed by separate blocks at participating institutions, separate programme components that may be pursued at the partner institutions, or inter-locking curricula pursued separately (de Boer, 2017; QAA, 2015). Although the overall programme is a joint enterprise, each institution is responsible for its own credential award. If the qualifications are at different levels, then institutions must deliver a large share of the instruction for the level of degree they are offering. Within the Bologna Process, these are classified as dual (or multiple) degree programmes.

The fullest extent of joint delivery is "integrated curricula", involving basically equivalent contributions from partner institutions in the creation, management, assessment and certification of study programmes (Cacheiro-González et al., 2013). Students in effect attend all the involved institutions, and must fulfil the requirements of each to receive their degree. Under the Bologna Process, students in joint degree programmes receive a single certificate bearing the seals of all the involved institutions, though where there are legal or regulatory impediments to providing a single certificate students may receive dual or multiple degrees with equivalent implications. Institutions may also jointly operate programmes with larger volumes of learning leading to the equivalent of multiple stand-alone (non-dual) degrees from each participating institution, most often at the master's level. In all these cases, at least in Europe, certificates/transcripts, records of achievement or diploma supplements should acknowledge the joint delivery of the programme. Within joint and dual degrees, institutions may retain considerable authority internally, or create a joint board or consortium with powers to exercise academic oversight, determine academic regulations, approve programme elements, conduct assessment, etc. (QAA, 2015). These activities must comply with each institution's internal policy frameworks even when pursued jointly.

Finally, many collaborations combine co-ordination with joint delivery. Returning to Floyd's observations of college-university collaboration in North America, the two other models that often combine joint delivery and co-ordination are: 1) concurrent use of campuses or university centres where universities and colleges collaborate to locate joint diploma/degree programmes and/or degree articulation opportunities on the college campus; and 2) college campuses operating as offshoots of a parent university (Boggs and Trick, 2009). In transnational provision, institutions may also pool degree-awarding powers often in the context of common campus platforms (QAA, 2015).

Prevalence

Systematic evidence regarding the prevalence of these different forms of collaboration in instruction is limited. It has become the norm for institutions to accept transfer credits, while many institutions participate in student exchange programmes.

Among 782 institutions that participated in the 2013 International Association of Universities (IAU) survey, 80% reported offering dual degree programmes (in ACE, 2015). Among Dutch higher education institutions' 45 accredited joint degree programmes, 30 involve multiple domestic institutions, most at the master's level (de Boer, 2017). De Boer also indicates that inter-university research schools "are widespread in the Netherlands", connecting faculties from multiple universities, facilitating modules for affiliated PhD candidates and other related collaborations. Large numbers of Dutch faculty also hold joint appointments between different institutions, and with private sector companies (de Boer, 2017). In contrast, less than 1% of graduate students attended Japan's 17 joint graduate schools in 2016, which operated in niche fields with high per-student costs of instruction (Yonezawa, 2017).

Joint international programmes have been an area of widespread focus in recent years. In the IAU survey, 64% of institutions had degree programmes with foreign partner institutions, while another survey of institutions in 14 European countries found that over half were participating in international joint degree programmes, but had a weak response rate in many of the jurisdictions (in ACE, 2015; INTERUV, 2013). In the US, nearly half of the institutions that responded to the 2011 Mapping Internationalisation on US Campuses survey reported offering or being in the process of developing one or more international collaborative programmes in partnership with a foreign institution (in ACE, 2015). Fully 95% of institutions (245 in 28 countries) responding to an IIE survey reported planning to develop joint and double degree programmes as parts of their internationalisation strategies (JDAZ Project Team, 2015).

Transnational education is also heavily reliant on collaborations, for example 40% of UK offshore education in 2014/15 was offered in collaboration with a local provider (New Zealand Productivity Commission - Te Komihana Whai Hua o Aotearoa, 2017).[2] In many of these programmes the students do not attend any courses on campus in the United Kingdom (QAA, 2015).

Cacheiro-González, Mata-Benito and Ubachs (2013) suggest that future networked curricula will likely involve much more online provision, especially in transnational education, but that at present most networked curricula continue to use face-to-face instruction. Fully 40% of the 249 institutions that responded to a 2013 EUA survey reported that they participated in joint online provision and 14% indicated that they planned to (Gaebel et al., 2014). Among institutions offering joint online provision, more than half did so at the level of some faculties, just over one-third through only some faculty members, and less than 10% extensively across the institution. At 70%, a still larger share of institutions viewed e-learning as a way to collaborate with foreign institutions, with fewer among universities of applied sciences (UAS) than among universities, and 57% to collaborate with co-national institutions – fewer among specialised institutions. Yet, only 60% of institutions who reported that collaborating internationally or nationally was important were doing so or planning to do so. This research suggests that the extent of joint online provision falls well below potential.

Most institutions surveyed also indicated that they would be interested in collaborating with other institutions to deliver Massive Open Online Courses (MOOCs). Specific

activities for collaboration would include programme design and development; co-creation; provision of services to facilitate promotion and sharing of MOOCs; and the establishment and implementation of a QA framework. As noted previously, many institutions are providing joint platforms for MOOCs, particularly in Europe, although to such a point where consolidation of platforms may be inevitable.

Systematic and national data on campus sharing collaborations are not available, but one can get a sense of their prevalence in some jurisdictions. In March 2008, at least seven South-eastern US states had at least one Higher Education Center, wach an agglomeration of public and private partner institutions delivering courses in a common location, and the largest Higher Education Center had at least 14 institutional members in 2007 and had 2 700 graduates since 2000 (Flora and Hirt, 2010). This review identified at least one other shared campus initiative in England (HEFCE, 2012). All these initiatives sought to service underserved regions.

2.3.2 Unbundling instruction

Unbundling is "the differentiation of tasks and services that were once offered by a single provider or individual […] and their subsequent distribution among multiple providers and individuals" (ACE and CEAI, 2014, p. 1). This may occur within institutions, through the distribution of activities into different departments, or of responsibilities from single-faculty members to specialists in different areas. Unbundling of services and professional activities has been widespread within institutions for a long time, as institutions have developed distinct administrative and student services, and faculty responsibilities for administration and advising have evolved. Unbundling alters the role of the professor as a solitary professional with exclusive responsibility for instruction, dividing tasks across teams of professionals with specialised and differentiated roles, including assessment developers, student learning coaches, academic advisors, and lecturers.

Unbundling is relevant to this paper where it involves the distribution of tasks across different institutions and/or their employees, particularly in instruction. Much the same as within institutions, unbundling across institutions typically aims to reduce the costs of provision or provide otherwise unavailable access to skills. However, inter-institutional unbundling can also separate instructional functions to address conflicts of interest (notably between delivering courses, and assessing and validating learning) and help build a programme's prestige to attract students (Usher, 2016a, 2016b).

The provision of instruction involves four core tasks (Contact North, 2016):[3]

1. Course design and development
2. Course delivery
3. Assessment of learning
4. Validation of learning through course recognition and by awarding a credential.

Of course, many micro-tasks can fall under these four categories, such as within course design and development: curriculum design and instructional design. Still, unbundling of instruction via institutional collaboration appears to most often involve redistributing the core tasks. Advances in ICT have facilitated unbundling, often across quite distant physical locations.

Historically, some higher education institutions have separated the assessment and awarding of credentials from course design and development and delivery (Usher,

2016b). In particular, institutions without degree-granting status have often found partners to conduct assessment and award credentials to the students they instruct.

A more recent model is prevalent in transnational education, where institutions may award degrees to students who complete programmes offered by typically overseas bodies without degree-awarding powers, through franchise and validation arrangements. UK institutions in particular have the power to grant degrees through these means, which allow private providers to provide degree awards with attractive branding (QAA, 2015; Stanfield, 2011). Some of these programmes are offered online, others are delivered on physical campuses, at times essentially as articulated agreements with the students attending the UK campus for later years of their programmes. Some overseas bodies have subsequently obtained degree-awarding powers, but maintained the capacity to award degrees with an "accreditation" from the UK partner institution that allows them greater autonomy in adjusting the programme. This may result in a form of joint degree where the UK institution is less involved than typically in the operational management of the programme and the students only physically attend one of the institutions. It can also lead to a shift from articulated degrees to dual degrees, such as 1+1 arrangements at the master's level leading to two separate awards.

Other models of unbundling can involve institutions outsourcing course design and delivery in a more limited fashion, without entering into formal franchise and validation style arrangements. In the United States, the National Center for Academic Transformation has designed a series of common introductory courses, which institutions use as a way to reduce costs (ACE and CEAI, 2014). Japanese institutions have outsourced some instruction (often in foreign languages) to corporate subsidiaries, other corporate foundations or venture businesses, often for online delivery from overseas such as by faculty based in the Philippines (Yonezawa, 2017).

Many practices imply separating out certain activities from the bundle, but then co-operative delivery of others. For example, one model in the United States has been to deliver courses on campus using an elite online lecturer from another institution, who would co-ordinate local instructors to facilitate discussion groups (McPherson and Bacow, 2015). This model fully outsources course design and development, but implies joint course delivery and potentially course assessment. Many open or purchased educational resources also support but do not fully replace local design and development, delivery and assessment.

2.3.3. New learning technologies and their implications for collaboration

The above discussion of joint programmes and unbundling has provided an indication of the close relationship between collaboration and new ICT. Of course, ICT can help bridge distances between institutions. The development of new ICT has transformed many aspects of higher education even more profoundly than this, however, and will continue to do so, though perhaps more slowly than some have predicted. The global education technology industry is forecast to reach USD 252 billion (United States Dollars) in annual turnover by 2020 (Escueta et al., 2017, p. 22). The development of online learning and Open Educational Resources (OER) has important implications for collaboration, although analysis of these technologies and their impact is necessarily uncertain. This analysis draws heavily on research outlined in Annex B, especially the US case study.

Online instruction

Online learning, in general, has pursued two primary goals: 1) to expand access to higher education based on geographic and temporal flexibility, as a key component of many jurisdictions' lifelong learning strategies; and 2) to achieve efficiencies through higher faculty-student ratios, reduced space demands, and less labour-intense instruction (EADTU, 2016a; Online Learning Task Force, 2011).[4] Empirical research increasingly shows that online instruction is significantly less effective in promoting learning than blended and traditional face-to-face approaches, at least at the first-cycle level and especially for disadvantaged students, which undercuts the access goal. Meanwhile evidence of greater efficiencies in online instruction is actually very limited (Carey and Trick, 2013).

The American experience suggests strongly that high-quality online instruction can imply significant costs. Per-course costs for very high-quality programmes in the United States are estimated to range from hundreds of thousands to over a million USD (again see Annex B for more discussion on this point). Scale appears essential to finance these costs, while nevertheless achieving efficiencies. Collaboration and consolidation provide a pathway to achieving scale, which otherwise few institutions can likely achieve on their own except perhaps in narrow specialties (Carey and Trick, 2013; EADTU, 2016b; Online Learning Task Force, 2011). Collaboration can also allow institutions to share critical skills and infrastructure.

Carey and Trick (2013, p. 2) suggest that higher education systems are likely to be more successful in online education with a more limited set of high-quality offerings than "a multiplicity of courses and programs on a small scale". This vision will require much greater institutional co-ordination. MOOC platforms are providing some co-ordination by only partnering with institutions that have certain levels of financial resources and prestige (EADTU, 2016c).

Open educational resources

The Massachusetts Institute of Technology (MIT) provided an important impetus to the widespread development of OER by launching its OpenCourseWare programme in 2002. Over 100 universities now make all notes, course materials and videos available for open access through the OpenCourseWare Consortium (CENGAGE, 2016; Freitas et al., 2015).

OER are "teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge" (in CENGAGE, 2016, p. 2). Based on this definition, MOOCs are a form of OER.

OER can be understood as a form of loose institutional collaboration, in which institutions and their faculty and other stakeholders share resources. It can help expand the variety, quality and depth of educational resources at institutions' disposal through materials that are free in principle (Online Learning Task Force, 2011). It could also help to improve student learning especially in jurisdictions where many students do not purchase required texts due to the cost. For faculty, sharing and reuse of e-learning material can mitigate the cost of resource development, and provide a low risk entry route into the use of digital resources (EADTU, 2016b). Finally, producing and distributing

OER can permit institutions and jurisdictions to achieve wider profile (Online Learning Task Force, 2011).

Organising and assuring the quality of OER requires significant investments however; OER that is difficult to navigate is not "cost-free" for users (Online Learning Task Force, 2011). Instructors may require support in using OER content to support cohesive and effective learning experiences (CENGAGE, 2016). Lastly, finding a sustainable financial model is also a challenge for OER, including MOOCs, because content development is costly (Annand and Jensen, 2017). More intensive collaborations and alliances can backstop OER to address these challenges.

For example, credit recognition has been a key hold-up on the development of a financial model for MOOCs. Even among 33 European institutions providing MOOCs, a survey found only five would recognise MOOCs delivered by other institutions, and even then on condition of credits being awarded or students passing an exam (which could be proctored by a trusted party), or only in some disciplines (Gaebel et al., 2014). Yet, institutions reported growing pressure to recognise learning outcomes and award credits for their own MOOCs and those of other institutions.

OER, including MOOCs, also already rely on platforms that aggregate resources from across institutions to achieve economies of scale, provide QA and facilitate user access (Annand and Jensen, 2017; Online Learning Task Force, 2011). The private sector has developed some of these platforms, but others are mainly institutional consortia, such as the Futurelearn consortium of 17 UK institutions (Carey and Trick, 2013; EADTU, 2016b; Stacey, 2013).

Other implications

For many countries, online learning and OER are likely to become an area for competition with other higher education systems, instead of internal competition among institutions. Collaboration can take advantage of joint brands in penetrating global markets (Online Learning Task Force, 2011).

A survey of 100 European institutions found that most would prefer to collaborate with other institutions to establish MOOCs at scale instead of outsourcing services to commercial parties, using public resources instead of private sector funds or fees (Gaebel et al., 2014). However, in many areas institutions will nevertheless need to secure services and technologies from the private sector to deliver effective online and technology-supported learning, and will have to learn rapidly as technologies and methods advance. Joint procurement and/or information sharing could help institutions to make their purchases more effective and cost-efficient (Carey and Trick, 2013).

The growth of OER and online learning may also produce deeper changes in the organisation of instruction, reducing its solitary nature. OER is partly about shifting cultural practices towards greater openness, and may be fostering forums for collegial discussion of teaching plans and practices in concert with social media. As well, few if any faculty are capable of delivering high-quality online instruction on their own; the medium requires team work at least with wider teams of technicians. Finally, online instruction can facilitate monitoring of course content, as well as faculty performance in terms of speed of interactions and feedback to students, and student results (Carey and Trick, 2013).

2.4. Collaboration in other domains of activity

2.4.1. Collaboration in research

Collaboration among higher education institutions is more widely established in research than in instruction (Stein and Short, 2001). Researchers commonly share data, resources and equipment, and co-develop theories (Gazni et al., 2012). In fact, scholarship is in many respects fundamentally collegial, with strong peer review structures that always extend across institutions (Larivière et al., 2015).

Patterns of research collaboration vary across countries. Using survey data with more than 10 000 responses from full-time university academics in 11 European countries, Kweik (2015) found that two-thirds of academics collaborated internationally, with national rates ranging from over 80% to under 48%. Small European countries appear to be the most internationally collaborative in the world, due to small size limiting the pool of potential domestic partners, the close proximity of other countries, and extended historical relationships (De Rassenfosse and Williams, 2015; Gazni et al., 2012; Kwiek, 2015). Outside Europe collaboration in research is relatively intense between the United States and Canada, and less intense in East Asia (Shin et al., 2013). Other studies indicate that collaboration is more common in developed "core countries" with greater scientific development and more open academic cultures, and developing country researchers gain from collaborating with core country partners (Gazni et al., 2012). High impact institutions are significantly more collaborative than others (Gazni et al., 2012). Other studies suggest that countries with weaker scientific infrastructure collaborate more internationally (Larivière et al., 2015; Shin et al., 2013). The literature continues to debate whether institutions in English-speaking countries collaborate more internationally than other those from other countries (Shin et al., 2013).

In certain disciplines collaboration is essential for research success and recognition, whereas in others the "lonely scholars" model may predominate (Kwiek, 2015; Kyvik and Reymert, 2017; Shin et al., 2013). Natural science disciplines and those with universal application tend to involve greater international co-authorship than arts and humanities, and those with local application (Larivière et al., 2015). Kweik (2015) found self-reported international collaboration rates ranged from 75% in the physical sciences and mathematics to 50% in professional fields. Research from Gazni, Sugimoto and Didegah (2012) indicates that medical fields may have the highest rates of collaboration but concentrated among within-country teams, whereas physics and mathematics favour international teams. As well, resource-based fields like Microbiology, Immunology, Molecular Biology, Biology and Biochemistry have more multi-authored publications than theory-based fields. The social sciences and the humanities have the lowest rates of collaboration – a 2013 study of Australia, New Zealand and the United Kingdom found two-thirds of humanities academics did work alone, in contrast with only 7% in the sciences (Gazni et al., 2012). Research team sizes also vary by field. Patterns of collaboration in research also vary between senior and junior faculty, with patterns depending greatly on context and incentives for promotion and funding, and among male and female researchers (Abramo et al., 2013, 2014; Shin et al., 2013).

Growth of collaboration in research publications is a longstanding trend (Shin et al., 2013). In one major study, Larivière et al (2015) review the number of authors, addresses and countries for 32.5 million research papers and 515 million citations from 1900-2001. They find that single-author papers made up 7% and 38% of publications in the 2011 in the two separate databases they use, in contrast with 87% and 97% respectively in 1900.

From 1973 to 2011, the share of papers from only one address fell from 70% across both databases to 30% and 46%. Gazni, Sugimoto and Didegah (2012) reviewed 14 million documents in Thomson Reuter's Web of Science and also found the size of research teams increasing at all levels, total author numbers, institutions, and countries on each paper in the past ten years. Another study found that globally the number of international co-authored scientific articles published doubled from 1986 to 1999, and tripled in Japan and Germany (in Shin et al., 2013).

Research collaboration is considered a defining feature of "big science" and a result of the "professionalization of science" (Gazni et al., 2012). Most research leading to Nobel Prizes is now collaborative, leading some to describe each prize's limit to three recipients as an "anachronism" (Larivière et al., 2015). In essence, collaboration allows for researchers with different and ideally complementary skills – which are increasingly very specialised – to bring together their collective intelligence (Larivière et al., 2015). Teams may also use limited resources more efficiently. Many studies propose that research collaboration mostly appears where equipment and resources are scarce, and in fields where equipment and infrastructure are too large and complex for single researchers (Gazni et al., 2012). Finally, teams can have advantages in securing funding and there is a relationship between collaboration and prestige, for example rankings treat all affiliated institutions equally (Larivière et al., 2015; Shin et al., 2013).

Research collaboration historically has depended greatly on individual academics' activities (Ripoll-Soler and de-Miguel-Molina, 2014). However, Shin, Lee and Kim (2013) discern five types of collaboration in academic research, only the first two of which strictly concern individual researchers: conventional, interdisciplinary, inter-institutional (including with external research institutes), cross-sectors (i.e. with public and private actors), and international. Globalisation, increasing attention to prestige, and the progression of studies in many fields are reinforcing the importance of institutional collaboration.

Traditional system-level efforts to promote institutional research collaboration have adopted two core approaches: the first to concentrate research capacity within a small set of elite institutions; and the second "hub-and-spoke" model to spread research capacity but maintain linkages and key nodes of concentrated capacity. Collaboration under the hub-and-spoke model aims to build capacity in peripheral institutions, but also for that capacity to feed into the work taking place at leading institutions (Goedegebuure, 2012). Many jurisdictions mix these approaches, however among the policy profiles, Denmark and Finland appear to have emphasised the first approach in recent years through concentration initiatives, and Australia and Flanders the second.

Governments have also sought to facilitate information sharing from and for research, with benefits for other areas of activity, such as instruction. Open access to research publications was a first step towards a broader Open Sciences movement, including open access to research data. This is a fast-moving area of collaboration that can promise to improve research efficiency and the sharing of knowledge.

Collaboration in research, including Open Science, deserves more attention than this paper can provide. In terms of the core focus on instruction, however, many of the patterns in research collaboration at the faculty level appear likely to apply to instruction as well.

2.4.2. Collaboration in service and external engagement

By its nature service/engagement is fundamentally about institutional collaboration, although not with other higher education institutions so much as with external parties such as governments, businesses and other community organisations. Collaboration among institutions can help connect external actors efficiently with the most suitable higher education partner and foster broader partnerships pooling expertise and resources from multiple institutions at once. Alliances and mergers tend to focus more on teaching and research goals than service and external engagement. Where institutions collaborate explicitly to strengthen service and external engagement, they typically do so in less intensive ways.

Institutional service/engagement is often closely associated with economic clusters. Porter defines clusters as "geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions [...] in particular fields that compete but also cooperate" (Porter, 2008, pp. 213–214). Porter's "associated institutions" often include higher education providers, which in fact often play a central role by providing inputs of knowledge and skills. Higher education systems may also be understood as clusters (Basillote et al., 2016).

Belonging to a cluster does not always entail formal collaboration. However formal cluster partnerships often involve multiple higher education institutions. For example, the Norwegian Centres of Expertise Seafood Innovation Cluster includes multiple higher education institutions and research centres, alongside companies and associations (The Seafood Innovation Cluster, 2017).

Higher education institutions may collaborate in activities relevant to many clusters at once. Often such policies support the establishment of platforms for entrepreneurship, for example, as in the Canadian cases of Creative Destruction Labs and Nova Scotia's Sandboxes (Nova Scotia Sandbox, 2015). The former programme was developed at one institution, but expanded its activities across Canada through collaboration with institutions in four additional cities (CDL Team, 2017). In Nova Scotia, each of four initial sandboxes was an institutional collaboration to provide resources and academic programming to would-be entrepreneurs (Government of Nova Scotia, 2014). Another key activity may be to support student recruitment by employers (Dalhousie University et al., 2017).

Higher education institutions can also engage with numerous public-sector organisations to enhance social services, again often in concert. Common initiatives promote completion and pathways to postsecondary for youths in compulsory education.

2.4.3. Collaboration in support services, administration and infrastructure

Institutions also collaborate in providing administrative capacities to support teaching, research and service/engagement. Collaboration in this area remains much more the norm than in other areas of institutional activity. In some jurisdictions, universities formed precisely to deliver joint services in support of previously separate faculties of scholars working in distinct fields, demonstrating that collaboration in providing supporting capacity has a very long history (Usher, 2014). Nevertheless, Rothwell and Hebert (2015) note that higher education institutions (in the United Kingdom at least) have had a greater historical aversion to collaboration in business functions than other economic sectors, such as private finance or transportation.

Research suggests that so-called "back-end services" offer the greatest promise for financial efficiencies (HEFCE, 2012). These activities can include data management and systems; cost sharing groups and strategic sourcing; asset sharing (e.g. equipment); student facing campus services (accommodation, careers, catering); academic support (examination administration, programme administration, registry, student records); and shared business services (e.g. finance, information, communications and technology services, human resources) (Rothwell and Herbert, 2015). International marketing and recruitment is also a growing area of collaboration, often connected closely to government attempts to develop regional or national brands.

In different jurisdictions, institutions have varying responsibility for various types of student services, which in many cases are the responsibility of other public agencies or procured from private sector providers. Domains of student services include: academic advising; career advising and support; psychological counselling; health services; disability services; student financial aid; residences; and advising of international students. Where these services are provided by regional or national agencies, as is the case across many European jurisdictions, it is not always clear to what extent provision is collaborative or centrally co-ordinated. This collaboration between higher education institutions and public-sector agencies also seems to reflect a greater willingness to collaborate with non-competitors (Stanfield, 2011).

Physical infrastructure or equipment collaboration typically involves institutions in the same geographic area sharing what they can to achieve efficiencies, particularly when it comes to very specialised and expensive space and/or equipment notably in research. Often these collaborations can also develop new capacity in underserved geographic areas (Askin and Shea, 2016; HEFCE, 2012). Shared infrastructure almost necessarily implies collaboration in administration, but may entail varying degrees of collaboration on instruction, research and engagement/service.

This paper does not examine in detail collaboration in the provision of support services, administration and infrastructure, since it is widespread, not a focal point of public policy debates, and operates at a distance from institutions' core academic mission.

3. Gauging the impacts of collaboration and consolidation

This section provides an overview of system-level evidence on the impacts of collaborations, alliances and mergers (CAM) and whether they have met common objectives, with a special focus on government-promoted CAM initiatives. It will first summarise research on the academic and financial impacts of mergers, and then consult more limited evidence on collaborations and alliances, before closing the section with a discussion of CAM risks.

CAM outcomes are difficult to evaluate. The category includes a vast diversity of arrangements that can be very difficult to generalise or compare. Outcomes also often take a long time to realise, and may be easily confused with the effects of concurrent changes within institutions or in their wider context. Many studies evaluating CAM focus on individual initiatives or institutions, fewer explore experiences across higher education systems, and still fewer use rigorous empirical methods. This leaves the evidence base on the impact of CAM mixed and inconclusive.

3.1. Academic impacts of mergers

3.1.1. Quality of instruction

The quality of instruction in higher education is very difficult to measure. Most studies use various intermediate indicators to gauge the impacts of collaboration and consolidation on teaching, including measures of student progression and completion, or they report on changes in institutional teaching structures and processes.

Russell (2017) used nationally reported indicators, including spending, student fees, enrolment, degrees awarded, and completion rates, to analyse the impacts of 369 mergers of public and private higher education institutions in the United States between 2001 and 2013. The study found that mergers did not significantly affect one-year student retention rates, nor significantly alter the number of degrees that institutions offered.

In another study using a differences-in-differences methodology, Russell (2016) evaluated five 2013 mergers in the University System of Georgia (USG) that explicitly aimed to improve student retention and completion by redirecting resources from administration to student support. She found that the mergers did in fact increase the probability that a student would complete the first two years of college by 7.4 percentage points, and seemed to be associated with a shift in spending towards academic support, reflected in increased hiring of academic affairs personnel. Administrative leaders also suggested that the consolidation process created opportunities to quickly implement policies to promote completion that might otherwise have been infeasible. Retention gains were spread across various types of students, but principally based on higher likelihood of re-enrolment after first year and after the first semester. The study focused only on short-term impacts of mergers given the brief time between its preparation and the merger events.

Iraci Capuccinelo and Bradley (2016) also use a differences-in-differences approach to evaluate the effects of 21 mergers involving 43 English FE colleges between 2004 and 2007 (affecting approximately 134 000 students). They found that mergers raised the risk of dropout by 1-8 percentage points in three of the four years studied, although in the other year dropout fell. Their research suggested that the short-run effects on dropout dissipated over time, indicating that short-run disruption can undermine the student experience increasing dropout. Iraci Capuccinelo and Bradley also suggest that forced mergers increased dropout even more, related to a major report and change in government policy beginning in 2005, presumably again based on greater disruption. Across programme types, dropout rates typically fell for technical and scientific programmes, suggesting these programmes "may benefit from increases in scale and scope."

In 2007, the Learning and Skills Council of England conducted a review of mergers between FE and higher education institutions (in Payne, 2008). They found that merger outcomes were varied and contingent, but often included some growth in enrolment (particularly of part-time students), the development of strong articulation between FE and higher education (although not in the short-term); improved retention and completion in FE and higher education programmes that FE colleges previously delivered, and little direct evidence of improvements in the "learning experience", although this is notoriously difficult to measure. As well, half the institutions seemed to gain in enrolment and half experienced enrolment declines.

A 2003 study for the then UK Department for Education and Skills (UKDES) evaluated 17 FE college mergers between 1996 and 2000 (Centre for Education and Industry University of Warwick, 2003). It found no overall evidence of success or impacts; although in many cases it was too soon to make judgements (it assessed nine of the mergers as "successes" and seven as "partial successes" relative to their original goals). Student achievement, impacts appeared particularly diverse depending on programme area, with generally few short-term benefits and no guarantees of longer-term outcomes. The study found especially clear evidence of marked and rapid benefits where colleges with "poor financial histories" merged with larger, wealthier partners.

Skodvin (1999) indicates that mergers in Australia, the United States and the Netherlands appeared to improve institutions' academic offerings and standing, especially in terms of programme breadth and depth. However, mergers of polytechnics and Gesamthochschulen in the United Kingdom and Germany respectively did not fulfil their objectives to help these institution types achieve more equivalent status to universities.

Studies indicate that mergers pursuing diversification or complementarities were more successful than those seeking academic integration or the elimination of duplicate programmes. Co-ordination across distances and cultural barriers often prevented academic integration and collaboration between individual staff members following a merger. A 2007 analysis of mergers in China (post-1994) also found the most significant benefits related to expanded and enhanced academic portfolios, whereas administrative gains were limited (in Pinheiro et al., 2015).

Harman (2000) reviewed the impacts of Australia's three merger waves from 1960-1981, 1981-1987 and 1987-1991, which are detailed in the brief policy profile in Annex A. Drawing upon institutional evaluations and opinion surveys, he concluded that they yielded academic benefits that included facilitating the development of strategic infrastructure; strengthening academic programmes with more professional faculty and broader ranges of disciplines; raising enrolment in degree and post-graduate courses; and expanding student services

3.1.2. Research performance

Evidence on the effects of mergers on research appears especially limited. This may be a consequence of the fact that most mergers involve higher education institutions that are not research intensive, which means there is little research activity for the mergers to affect, and this limited activity would be of limited interest for study (Ripoll-Soler and de-Miguel-Molina, 2014; Skodvin, 1999).

Nevertheless, some studies have found a quantitative increase in scientific production resulting from mergers, while others (among Chinese research universities) have found little change in measures of research impact (in Ripoll-Soler and de-Miguel-Molina, 2014). One study of 25 merged institutions in China found no important scale effects on research productivity after two years (Hu and Liang, 2008). Mao, Du and Liu (2009) considered 20 merged institutions and found that the mergers somewhat improved knowledge production in humanities and social sciences by 2005, with most improvements coming in the first two years after the merger and then fading away – it is unclear to what extent these improvements relate to short-term government preferences in providing research awards. Skodvin (1999) indicates that Australia's merger wave did appear to strengthen many institutions' research output, while Harman (2000)found that it raised faculty research activity. Mergers have not caused major short-term changes in universities' international rankings, which would generally reflect changes in underlying research performance.

Research evidence with respect to institutional size and research performance across OECD member countries is neither methodologically rigorous nor generalisable. A very recent correlational study, using data on all universities in Europe, found that the size of university has a negative impact on medical research quality, but generalist universities perform better than specialist institutions as do institutions with large numbers of international collaborations (Bonaccorsi and Secondi, 2017). Other research in Norway did not find any direct relationship between department size and scientific productivity (Kyvik and Reymert, 2017).

3.2. Financial impacts of mergers

The Russell (2017) review of public and private institutional mergers in the United States between 2001 and 2013 could not confirm that they achieved economies of scale, as they did not produce statistically significant effects on spending per full-time equivalent student (her point estimate suggested a 6% reduction). However, total spending is a very limited measure of economies of scale, given that savings in one area could be reinvested in other activities, as the other Russell (2016) study on mergers in Georgia suggested was occurring.

In a review of 25 mergers in English higher education that took place between 1996 and 2009 Johnes (2014) and Johnes and Tsionas (2015) found that merged institutions were significantly more efficient than pre-merger and non-merging institutions. Efficiencies appeared in the immediate years following the merger and faded thereafter. However, the Johnes study lacked a control group and therefore could not control effectively for selection bias. Recognising this uncertainty in the data, eleven of the mergers were also much less likely to have improved efficiency, indicating significant case-by-case variation. Overall, Johnes (2016) judges that mergers are less likely to achieve hoped for efficiencies than often argued, as economies of scale and scope appear limited and efficiency gains are relatively brief.

The previously mentioned 2003 study for the UKDES (in Payne, 2008) found evidence of: economies of scale in specialist colleges; efficiencies through curriculum integration; better results in reducing over-provision where institutions within the same cities merged; and possibilities for improving estates and facilities including through easier bidding and access to capital funds (e.g. borrowing).

Harman (2000) finds that Australia's three processes appeared to achieve significant efficiency gains. Yet, overall Skodvin (1999) finds that mergers rarely generate financial savings based on his read of the Australian case and others, except among US public and private institutions. He finds savings are particularly uncommon in the short-term because they generate significant costs, even on the administrative side – in fact mergers often generate increased administrative employment due to increasing complexity and job protections. Longer-term economies of scale are often in administrative and support services and systems. Skodvin (1999, 2014) also finds that mergers do typically result in improved governance, management and administration. Administration in particular usually becomes more professional and efficient, which is often associated with mergers raising staff and management autonomy and conscientiousness. Stewart's 2003 review of merger evidence (in Payne, 2008) also indicated substantial cost savings are difficult to achieve, and where costs decline initially, while Lang (2002) argues this may be at the expense of lower service quality.

There is some evidence that mergers do allow institutions to survive when they otherwise might not. In the UKDES study (in Payne, 2008), mergers with stronger partners permitted financially weak institutions' survival in every case, while Skodvin (1999, 2014) notes that many private institutions in the United States have avoided bankruptcy or closure through mergers. The broad assessment of Harman and Harman (2003) is also that mergers have worked well in many countries particularly in addressing the lack of viability of public-sector institutions, as well as fragmentation.

3.3. Impacts of collaborations and alliances

A large body of relevant scholarship generally associates individual and institutional-level collaboration with stronger research performance. These findings are especially consistent for international collaborations, which studies often find have greater productivity effects than domestic collaborations, such that some still debate whether domestic collaborations improve productivity at all (Kwiek, 2015; Shin et al., 2013). Studies find that collaborative research tends to be published in more respected journals and/or receive more citations (Gazni et al., 2012; Larivière et al., 2015; Shin et al., 2013). Kweik (2015) found that researchers who collaborated more internationally published much more frequently (on average twice as many articles) across case countries and all clusters of academic fields. Finally, Larivière et al. (2015) find publications with higher numbers of authors, addresses and countries have had higher impacts since 1900. Collaborations with industry also have greater impact.

Kweik also notes that it is important not to assume causality in the correlation of collaboration and research impact; stronger researchers may be more attractive collaborators and have better access to funding to support collaboration. Still, the correlations between collaboration and research impact support the view that collaboration generates additional epistemic value (Larivière et al., 2015). One concern from Larivière et al though is that the constant increase in collaboration has meant teams must be increasingly large to achieve returns on collaboration.

The case of Flanders' *Associations*, detailed in an Annex A brief policy profile, illustrates how collaborations and alliances can greatly alter the structure of higher education systems. The *associations* between colleges and universities helped shift the distribution of enrolment by institution type from 75:25 to basically 50:50 in eleven years, due to the shifting of academic programmes to universities (Bennetot Pruvot et al., 2015). There is also an overall sense that the *associations* process led to greater resource efficiency. Yet, gains in research and teaching at these institutions likely remain limited, even though the number of research staff in university colleges (UCs) may have increased. No data was collected on infrastructure sharing, or impacts on innovation and management functions.

Various North American studies have tried to estimate cost savings from OER. One study found that savings from the use of OpenStax texts amounted to just over USD 29 million in 2015/16, the BCcampus Open Educational Textbook project saved students an estimated CAD 1.5 million (Canadian Dollars) over four years in British Columbia (Canada), and another campus-based pilot project at five US institutions reported average savings of USD 128 per student, per course (Annand and Jensen, 2017).[5] Institutional-level programmes at the University of Massachusetts-Amherst, Kansas State University, and Tacoma Community College respectively reported savings of almost CAD 1 million, over CAD 1.1 million and over CAD 1.1 million for outlays of CAD 60 000, CAD 96 250 and CAD 240 000. Annand and Jensen (2017) also cite two studies indicating that the use of OER increases student satisfaction and generally produces equivalent or better student learning outcomes.

3.4. The risks of collaboration and consolidation

CAM among higher education institutions are not always desirable. The literature review encountered many instances where institutions (and governments) decided not to move forward with all types of CAM initiatives upon investigation or following extensive negotiations, or where programmes were not renewed. Denmark, Norway, and Wales provide examples among the brief policy profiles in Annex A. The adverse effects of collaboration and consolidation may outweigh the benefits in some circumstances, while in many cases even promising initiatives may not succeed due to challenges in implementation.

3.4.1. Potential adverse effects

Collaboration and consolidation can have adverse effects, including reducing beneficial competition, producing diseconomies of scale, and reducing the diversity of educational programmes on offer.

Collaboration is basically the antonym of competition. This implies that encouraging CAM will reduce competition to some extent, which can expand institutional market power and risk fostering inefficiency – the opposite of a typical CAM objective (Payne, 2008). Russell (2017) found that between 2001 and 2013, American public institutions that merged increased tuition and fees by 7% and not-for-profits did so by 6%, compared to other institutions within the same states.[6] Price effects were largest (14%) for mergers of institutions in the same commuting areas with overlapping programmes, which would likely reflect mergers providing institutions' greater market power. These cost increases were also broadly consistent among merging institutions with similar or dissimilar prior fee structures, so institutions were not simply harmonising fees at a more expensive partner's rate. Institutions may also pursue CAM to enhance their bargaining positions relative to governments and independent granting agencies.

Researchers have not developed estimates of the relationship between institutional size and efficiency across a range of institutional types, sizes, and national contexts that offer policymakers with reliable evidence for action. It has been shown, however, that bigger is not uniformly better, either with respect to efficiency or research productivity. Studies have found evidence that universities can have diseconomies of scale, i.e. actually experience increasing marginal costs as they grow (Bonaccorsi and Secondi, 2017; Worthington and Higgs, 2011). Worthington and Higgs found that higher education institutions 25% larger than the mean size began experiencing diseconomies of scale, while Bonaccorsi and Secondi found that institution size had a negative impact on medical research quality.

Many also worry that cross-binary CAM can break down binary divisions, leading applied science institutions to lose their distinctive missions, including practice-based instruction that is closely aligned to labour-market needs and applied research that engages microenterprises or small firms. Policy profile experiences show that CAM initiatives across binary divisions can strengthen these divisions (e.g. Flanders) or weaken them (e.g. Norway), depending on the context and policies pursued. Harman and Harman (2003) found that Australia's cross-binary merger wave reduced institutional diversity and spread research resources across more institutions, but judged it a success overall. Nevertheless, the analysis indicates that cross-binary CAM can occasionally strengthen binary divisions where strict regulations ensure this outcome. Section 5.3 addresses concerns about negative impacts of collaboration and consolidation on institutional cultures and identities in greater detail, for all types of CAM and not only among those across binary divisions.

3.4.2. Implementation challenges

Whereas studies suggest that roughly 60% of private sector joint ventures fail, Lang indicated in 2003 that only about 20% college or university mergers fail, although he did not cite supporting evidence or indicate how he defined "failure" (Boggs and Trick, 2009; Lang, 2003). Harman and Harman (2003) also indicate that generally a high degree of institutional stability has followed merger waves, with few examples of substantial failure, not only in Australia but also in the United Kingdom in the 1980s and 90s. Yet, a definition of failure as simply whether or not merged institutions subsequently divorce is insufficient, as this definition presents CAM as the goal in and of themselves. Moreover, it seems unsurprising for fewer higher education mergers to lead to bankruptcy given higher education institutions do not operate in a normal competitive market, and many are publicly financed. Reinforcing this point, Harman and Harman judge that mergers of public institutions have been more successful than those of private institutions. Overall, it seems clear from all the evidence that a non-trivial share of initiatives pursued do not accomplish their full objectives

Among the greatest difficulties in CAM relate to implementation. The costs (time and money) and risks involved in collaboration relationships are usually the key trade-offs for the potential benefits, and seem to be frequently underestimated across almost all types of CAM (Cacheiro-González et al., 2013; Dicenso et al., 2008; Stein and Short, 2001).

The costs of CAM are also higher the more different the institutions' financial, bureaucratic and academic structures or schedules. Many analysts consider that it is much easier for institutions to pursue successful CAM with partners of the same type, i.e. between universities or between polytechnics (de Boer, 2017; Harman, 2000). Authors often also note that mergers that create dispersed campuses have greater difficulties

achieving their goals (Pinheiro and Berg, 2017; Skodvin, 2014). Networked institutions generate costs relating to technological infrastructure and travel, whereas co-located institutions can find greater efficiencies in use of physical assets and infrastructure (Skodvin, 1999).

As CAM increase in intensity, flexibility decreases, while complexity, costs and the risks of failure often rise (Association of Colleges, 2016a; HEFCE, 2012). Collaboration to significantly alter institutional practices and processes is more likely to be practically disruptive, through alterations of physical space, workflow, etc. Mergers are one-time "big bang" initiatives often very difficult to reverse, whereas less intensive forms of CAM can evolve and adjust over more extended time periods.

Ripoll-Soler and de-Miguel-Molina (2014) argue that collaborations and alliances typically offer much higher cost-benefit ratios than mergers and are much better in delivering concrete results in the short-to-medium term. HEFCE (2012) also argues that in many instances, the benefits of engaging in a collaboration or alliance could match those of a merger without the same cost or level of disruption. As of yet, these views have not accumulated strong empirical backing however. Somewhat in contrast, it seems that unitary mergers typically do better in the long-run than federal mergers in developing academic coherence and new institutional loyalty, delivering greater stability, cost efficiencies and improvements to programmes. Lang (2002) notes that federations by their nature involve numerous problems and generally do not generate significant cost reductions. Federal mergers may be less successful in achieving major rationalisation and integration, especially of academic programmes, and carry greater risks of ineffectiveness or organisational breakdown (Harman and Harman, 2003). A key source of instability is the greater possibility of federated mergers being reversed (Ripoll-Soler and de-Miguel-Molina, 2014). These analyses suggest mergers may trade off complexity and costs in the short-term for potential gains and simplicity in the longer term.

HEFCE (2012, p. 38) indicates that "mergers are more likely to be successful where, through a careful analysis of objectives and activities, most of the institutions' major operations are compatible or complementary". The corollary is that CAM efforts that substitute rather than complement are less likely to succeed, but inherently these CAM are pursuing more challenging objectives, such as to consolidate capacity and eliminate redundancies. Where CAM seeks to rescue institutions at risk of failing, there may be little choice but to pursue redundancies. In this case, as in many others, difficulties can relate more inherently to the specific policy goal being pursued than the collaboration-based approach.

Many analysts also argue that forced by government less successful than voluntary mergers (Harman and Harman, 2003; HEFCE, 2012; Skodvin, 2014). In part, this is surely a function of the act of imposition, however institutions do not merge voluntarily or involuntarily based on random assignment; governments may force mergers where more serious internal obstacles prevent voluntary action.

Section further discusses challenges in the implementation of CAM, and strategies to overcome these.

4. Policy measures to promote collaboration and consolidation

4.1. Why governments intervene

Although, as illustrated in the previous section, the evidence on the impact of different forms of collaborations, alliances and mergers CAM is comparatively limited and inconclusive, every OECD jurisdiction considered for this report was pursuing was actively pursuing initiatives to promote collaboration and consolidation, or had done so recently. Public authorities often seek to initiate CAM as a means to achieve higher levels of *quality* in research, teaching, service or institutional management; greater *efficiency* of public spending; or better *alignment* of the higher education system's range of institutional and programmatic offerings with public and labour-market needs. They may pursue these goals to magnify institutional strengths, or at times to remedy severe institutional deficiencies.

These objectives of greater quality and efficiency are arguably as relevant to higher education institutions as to governments. If institutions collaborate less than they should for their own interests – as well as for the interests of governments – policymakers need to ask themselves why this is (Boggs and Trick, 2009, p. 4). Economics literature identifies a host of patterns that undermine collaboration among private firms, independent from government policy frameworks (Boggs and Trick, 2009):

- Imperfect information regarding goals and capacities of prospective partners
- Absence of focal points means partners cannot identify areas of likely agreement
- Uncertainty and immeasurability of the quality of partners' potential contributions
- Third-party effects on perceptions by customers or other actors that may cause losses
- Irreversibility (of sharing intellectual property, merging, etc.) if the relationship ends
- Non-unitary actors have internal constituencies that may veto arrangements that would otherwise benefit the organisation as a whole
- Parties overstate their contributions to claim a larger share of net gains, with the aggregate effect of overstating costs relative to benefits of collaboration
- Enforcement difficulties because contracts may not describe the relationship adequately for a court or other third party, which means the parties must resolve disputes directly

These barriers appear to be very relevant to higher education institutions as well. In terms of being "non-unitary actors", collegial governance systems can inhibit collaboration among higher education institutions, while individual institutional employees often play a critical role in pursuing CAM and often are not compensated or recognised for the costs and risks that they personally incur (Cacheiro-González et al., 2013; Stein and Short, 2001). For example, meetings may take away from young faculty's scholarly activities required to attain tenure (Dicenso et al., 2008). A further constraint that Boggs and Trick

do not reference, but seems highly relevant, is that the costs of CAM accrue largely in the short-term, while the benefits typically come much later.

A fundamental factor specific to higher education is that it is very much a craft industry with each institution offering (or believing that if offers) a highly distinct product. Distinct values, cultures and identities build around that product, as does institutional prestige (Gazni et al., 2012). Collaboration, particularly in areas central to institutional missions, threatens this identity.

Additionally, three general features of the government policy framework can limit CAM especially in pursuit of consolidation:

- Extensive protections against reassignment or terminations among many higher education staff
- Widespread belief that governments are responsible for ensuring public institutions' survival, be this based on legal or political circumstances
- Uncertainty if external authorities will maintain relevant policies (Boggs and Trick, 2009)

All these factors combined are sufficiently powerful that institutions typically pursue only less intensive collaborations of their own accord. Analysts consider that purely voluntary, institutionally-driven mergers are rare (Benneworth and Zeeman, 2017). Even where mergers are pursued voluntarily, they may be "forced by circumstances" that governments influence or even shape (Ripoll-Soler and de-Miguel-Molina, 2014; Skodvin, 2014).[7]

Governments influence institutional CAM in two broad ways. First, they can influence patterns of CAM by establishing underlying legal and economic *framework conditions* within which institutions operate. Second, they can implement *targeted measures* to deliberately induce or sometimes block CAM between higher education institutions. A recent European Commission (2016a) review of structural reforms of higher education systems in Europe characterises four types of instruments governments can use to set framework conditions or implement targeted measures affecting CAM:

1. regulation (laws, Quality Assurance [QA], regulations, etc.),
2. funding (positive and negative financial incentives),
3. information (the use of information and communication), and
4. organisation (the use of experts, networks, infrastructure, agencies, etc.).

In practice, these mechanisms are often closely related and jurisdictions that have acted aggressively to promote CAM have generally used them in concert (Harman and Harman, 2003). The two subsections that follow consider, respectively, regulation-based instruments and funding policies used by governments across the OECD to influence CAM. Section 5 discusses information and organisation, in the context of addressing strategic challenges.

4.2. How governments intervene: regulation-based policy instruments

Legal and regulatory frameworks put in place by government my influence CAM by defining the legal status of higher education institutions; setting rules for licensing institutions and programmes; putting in place procedures for QA and; creating rules concerning intellectual property and privacy protection. This subsection examines these four areas in turn.

4.2.1. Defining the legal status of institutions

Legislation often enshrines distinct legal statuses for institutions, which can affect how they may collaborate, as well as the government's tools to encourage collaboration. Key institution types include: public and private; private for-profit and not-for-profit; universities and universities of applied science or polytechnics; and types of universities (e.g. research-intensive universities as compared to liberal arts colleges in the US). In many circumstances, there may be even greater diversity among the above institution types. Looking at one example, in England, from a purely legal perspective institutions may operate 1) under Royal Charter, 2) as companies limited by shares, 3) as companies limited by guarantee, 4) as higher education corporations, or 5) as trusts (Stanfield, 2011). Institutions and joint legal entities may also take on charitable status.

Why do institutions' statuses matter? Regulation of institutions under different legal acts can present important legal barriers to many forms of CAM. In fact, more intensive CAM are often out of the question unless institutions' legal statuses are first aligned. Differences between public and private universities have been an obstacle to mergers in Romania, as one example (Andreescu et al., 2015). To facilitate CAM across different types of institutions, for example, the Governments of Norway in the 1990s, Alberta (Canada) in 2004 and Iceland in 2011 adopted common prevailing legislative acts (Iceland - Ministry of Education, Science and Culture, 2010; Usher et al., 2016).

Legal statuses also have implications for government's policy tools. The five legal types of English institutions were listed earlier in order of declining autonomy from government, which serious affects freedom to collaborate (Stanfield, 2011). More broadly, it is natural that public institutions may be more subject to government directives to collaborate and consolidate for a host of reasons, whereas authorities may need to use more indirect measures to encourage collaboration with private providers. Even with respect to public providers, legislation may establish protections for institutional autonomy that constrain governments' policy options. Often governments have considerably less authority over universities than colleges, for example based on legislation and the composition of governing bodies at the institutions.

Frequently mergers and other intensive forms of CAM require government legislation to implement, which can provide governments veto authority, but also just slow down or complicate merger processes. In other cases, governments may change institutions' legal status to facilitate CAM. In France and Wales, governments helped facilitate mergers by allowing institutions to adopt a new legal status that actually maintained autonomy for institutions being integrated within the larger body, thereby alleviating political challenges. In Lower Saxony (Germany) the government also passed legislation establishing a new formal structure for a cross-binary merger. In England in recent years many charter institutions have had to ask that the Privy Council amend their charters to grant them the legal authority to provide joint degrees which they have received, (QAA, 2015). One suggestion in England has also been to grant institutions more flexibility to choose their legal form so that if they wished they could merge more simply, quickly and cheaply without requiring an Act of Parliament (Stanfield, 2011).

Some legal contexts allow governments essentially to order mergers through decrees or edicts, particularly in Northern Europe, including in Denmark, Flanders and Sweden. For example, Karlsson and Geschwind (2016) indicate that Sweden's Minister of Higher Education and Research directed the absorption of the Stockholm Institute of Education by Stockholm University in a press statement. Governments' legal authority to issue edicts may not always be clear. The Welsh Government threatened to dissolve institutions

to force mergers around 2011, but many debated whether it had this authority, since in the past it had only dissolved institutions with institutional consent (Gummett, 2015). By contrast, in England HEFCE (2012)indicates "there is no question of a top-down approach" to CAM.

In other cases, framework legislation explicitly permits or regulates CAM. In the Netherlands, the Act on Higher Education and Scientific Research (*Wet op het hoger onderwijs*, WHW) provides the framework for how institutions may collaborate without ministerial consent, identifying specific policies for different types of collaborations (de Boer, 2017). Ireland's Regional Technical College Act (1992 – section 5) indicates that Institutes of Technology (IoTs) can "enter into arrangements with other institutions in or outside the State for the purpose of offering joint courses of study and of engaging jointly in programmes of research, consultancy and development work" (in Finnegan, 2015) Meanwhile, in Romania the Law of University Consortia (287/2004 – *Legea consorţiilor universitare*, LCU) has constrained universities to only participate in one consortium, limited the objectives that institutions may cite as the formal rationale for joining a consortium, and previously only allowed absorptions rather than mergers that created new entities, which the Romanian policy profile in Annex A outlines in greater detail (Munteanu and Călin Peter, 2015).

Legislation creating higher education institutions almost always outlines their mission, which may promote collaboration. In Ontario (Canada), the legislation creating the University of Ontario Institute of Technology explicitly mandates that it "offer programs with a view to creating opportunities for college graduates to complete a university degree", which has pushed the institution to collaborate with a local college, including sharing campus facilities (Boggs and Trick, 2009).

Commercial competition laws may also restrict institutional collaboration, particularly in the private sector. In the US, the Department of Justice pursued MIT and other institutions for price-fixing, illegal under antitrust legislation, because they sought to co-ordinate their financial aid decisions for the purpose of reducing price competition (McPherson and Bacow, 2015).

Legislation regarding staff terms of employment and physical property can affect institutional CAM and government authority. In England, for example, mergers can have major financial implications for pension funds, with staff at institutional subsidiaries or joint venture companies created through collaborations not necessarily being able to participate in core institutional pension schemes (Stanfield, 2011). In the Netherlands, sharing of facilities is easier because institutions own their buildings and property independently (de Boer, 2017).

American states have established federated governing structures for their public higher education institutions through legislation, including in the cases of California and Georgia as discussed in the policy profiles. Individual institutions operate as sub-units within these broader co-ordinating "system" institutions, with overall governing boards varyingly appointed by – or even including – state leaders. In California, establishing legislation mandates system roles and defines areas for collaboration and competition within and among three systems. The most significant system-wide cross-binary partnerships in North America, which have facilitated the transfer of large numbers of students in California and also Florida, have benefitted from these mandates, which do not allow institutions to opt out of participation (Boggs and Trick, 2009). The balance of authority between the system and institutional levels may also permit the system to order collaborations and even mergers of member institutions, as with the USG. The USG has

also required system-level "integrated review" of newly-proposed academic programmes, taking into account financial and facilities concerns. Adoption of a system model has been considered in other jurisdictions like Australia (PhillipsKPA Pty Ltd, 2009).

Changes in legislation can alter the basis of relations between the government and institutions, moving towards higher levels of aggregation that must be created through CAM. France, for example, mandated participation in agglomerations called *Communautés d'universités et établissements* (COMUEs) partly through shifting its funding contracts and other relational policies to these units (Boudard and Westerheijden, 2017). Whether government policy instruments relate to the level of individual institutions or collaborations and alliances of institutions can also be an important framework condition.

Many jurisdictions have coupled major initiatives to restructure through CAM with major institutional governance reforms, including Australia (1987), Denmark (2005), France (2007) and Finland (2009) (Aagaard, Hansen, Rasmussen, et al., 2016). As a rule, these governance reforms have given institutions greater legal and financial autonomy, while expanding the role of external representatives in institutional governance and instituting a broader shift from collegial to professional management.

Where these reforms precede CAM initiatives, they shape framework conditions, as in Denmark, France and with polytechnics in Finland since 2014. Denmark specifically launched its merger initiative after new governance structures were fully implemented (Aagaard, Hansen, Rasmussen, et al., 2016). In other cases, authors describe greater institutional autonomy as a trade-off for compliance with governments' policy directions regarding CAM. The State of Lower Saxony, for example, clearly offered greater autonomy as a carrot for institutional leadership to implement the Leuphana University Lüneburg merger (Bennetot Pruvot et al., 2015). Greater autonomy for merged institutions also seems to reflect stronger confidence in the larger institutions' governance and management capacities.

4.2.2. Quality assurance

QA regimes establish framework conditions for CAM in the delivery of higher education by steering or channelling CAM – disallowing some initiatives, making others costly or difficult to achieve, and permitting others to flourish. A growing literature examines the impact of QA regimes on innovation in higher education, and it supports a number of policy-relevant observations, described below.

General quality assurance structures

Higher education systems employ a range of procedures for the assurance of quality. Two broad approaches can be distinguished. *Audit* processes assume that primary responsibility for the quality of learning lies with the higher education institution, and limit the role of public authorities to periodically checking that institutions have in place – and follow – quality procedures to assure the integrity of provision and suitability of outcomes. In contrast, *accreditation* procedures typically determine the "status, legitimacy, or appropriateness of an institution, programme, or module of study… [and result in] a determination of whether they meet a threshold standard [or not]. This is done through a comprehensive, external review that examines mission, resources (inputs) and processes (and, more recently, educational outcomes)" (Santiago et al., 2008, p. 263). Accreditation policies frequently set standards based on periodic review, or at the initiation of new study programmes, but they may also respond to punctual changes in

institutions and programmes. In the United States, accredited institutions must seek review and approval of "substantive" changes to their programmes and institutional structures by accrediting organisations – including mergers, new joint programmes, legal status changes, and subcontracting to unaccredited entities (Miller, 2017). Across these different approaches, institutions and programmes that fail to meet QA requirements may suffer financial penalties or in some jurisdictions even be ordered to close, and in many cases relevant QA requirements are enshrined in law.

As a general rule, QA arrangements that permit the widest scope of institutional autonomy with respect to the organisation of their educational activities – typically audit-based systems or those permitting institutional self-accreditation – appear to offer the widest scope for institutions to pursue collaborations and alliances. Conversely, stricter external accreditation creates greater bureaucratic restrictions and complexities for institutional actors interested in collaborating on instruction. Opportunities for collaboration appear to be inversely correlated with the extent of requirements for specific instruction inputs and processes. All QA structures establish some requirements for inputs and processes, but some are much stricter than others.

Higher education systems may also adopt hybrid arrangements for QA, in which different types of institutions are subject to different QA regimes. For example, in Australia and Hong Kong (China) some institutions are self-accrediting, while others are subject to external accreditation review. Under these systems, requirements to secure self-accrediting status may motivate institutional CAM. In some cases, as in Romania, size is the key deciding factor in determining what QA rules apply to a given institution. Where applicable, governments may also provide greater support to CAM involving institutions with stronger QA standing (Andreescu et al., 2015). Such systems are discussed in more depth in the later subsection on licensing of institutions to provide certain types of degrees.

Requirements for inputs and processes

QA regimes may adopt a diversity of input and process requirements. The stricter these rules are, the more difficult it is for institutions to pursue innovative programmes including collaborative initiatives.

Minimum input requirements for programmes often concern staff numbers in relation to enrolment. Often staff number requirements address qualifications and terms of employment. Institutions may also have to provide visiting faculty from other institutions certain types of contracts, where institutional arrangements to share staff (who could retain their primary place of employment) would be more efficient. Finally, policies may prohibit institutions or faculty from teaching with colleagues and practitioners from other types of outside agencies, such as private sector businesses or public ministries, and otherwise constrain collaborations for practice-based learning (Stein and Short, 2001).

In Japan, minimum input requirements are so detailed as to even include classroom space per student (Yonezawa, 2017). Full-time or associate professors must also deliver all "essential classes" and full-time professors may only be employed and pursue academic activities at a single university, although some nevertheless work part-time at other institutions. In contrast, Dutch higher education institutions have much more autonomy in personnel policies (aside from constraints under national collective agreements) and are able to pursue joint appointments (de Boer, 2017).

QA policies often set requirements for the courses institutions must offer within their study programmes. These standards may detail specific courses in more restrictive systems, such as those requiring external accreditation at the programme level. However, even audit-type systems may establish some requirements, as in Finland where legislation requires institutions to offer internally the full complement of compulsory courses for their degree programmes.

Residency requirements are common and dictate that institutions must deliver directly a minimum share of the course units required for their degrees, at times indicating that a share of classes must be in person which is an obvious barrier to online instruction (Akers and Butler, 2015; JDAZ Project Team, 2015; Stein and Short, 2001). A common basic requirement is that the primary institution deliver a majority of instruction, so a 50% threshold. The Netherlands has a two-thirds residency requirement (de Boer, 2017). Dutch institutions also previously had to offer programmes largely in the municipality recorded in the central register of higher education programmes, but this policy has been modified to permit distance instruction by the primary institution only, although first-year Dutch university of applied sciences (UAS) bachelor students still must also physically present in classes.

Where, under residency requirements, students may procure a large share of the instruction for their degree from other providers, there may still be constraints regarding what external providers' courses institutions may recognise. A frequent requirement is that external providers must be accredited under equivalent legislation to the host institution, in terms of also being public in many cases, or also universities or polytechnics. Where accreditation conditions are strict and very traditional, these requirements may block collaboration that could help alter sources of curriculum or methods of instruction, as in the case of many competency-based providers.[8] Taking the United States as an example, the 50% threshold in the United States has permitted some universities to link with MOOCs (e.g. Arizona State and edX) for the provision for the first year of the four-year degree, but it has effectively disallowed institutions from widening the use of external providers to private firms that offer a wider scope of curriculum and related services such as StraighterLine (Armstrong, 2015; Butler, 2015).

No legislation requires that UK institutions award degrees in their own name, the degree-awarding institution must simply be named on the degree certificate, which has led many private providers to seek collaborations with prestigious United Kingdom institutions, particularly for programmes overseas (Stanfield, 2011). Rules do indicate that institutions are responsible for the standards and quality backstopping their qualifications regardless of who delivers the instruction, and they require that institutions must have reasonable input in programme design and control over delivery to operate franchise or validation arrangements (QAA, 2015). In Japan, outsourced courses may be equivalent to regular classes only where the Ministry officially recognises this instruction (Yonezawa, 2017).

Some jurisdictions may also prohibit all forms of unbundling. For example, Dutch legislation requires that educational programmes include a "coherent whole of educational units", which would be violated by unbundling (de Boer, 2017).

Not all jurisdictions allow joint degrees legally. In some cases joint programmes are permitted but not joint credentials, making dual or multiple degrees a common workaround (JDAZ Project Team, 2015; QAA, 2015). In the Netherlands, again, joint degree programmes between universities and UAS are prohibited, but otherwise there are no special legal requirements for institutions to offer joint programmes beyond all study programmes requiring ministerial consent (de Boer, 2017). This is similar for the USG

(Miller, 2017). In other cases, joint programmes require special approval from external QA bodies compared to other programmes, and the waiving of standard requirements (Dicenso et al., 2008). Often accrediting bodies may not have adapted their standards and find that collaborative programmes lack focus, have governance problems, or seem to inadequately emphasise traditional frameworks in their respective disciplines (Stein and Short, 2001). At a more basic level, however, these types of degrees must meet the academic standards of both institutions, which are often a reflection of external QA structures, and consequently many exceed the standards applied to each institution on its own programmes (QAA, 2015). QA policies addressing joint and dual degrees, or other forms of collaborative delivery, generally maintain the basic principle of residency requirements, but adjust them for shared responsibility between the degree-granting institutions.

These policies also create rigidities in the types of collaboration acceptable partners may pursue. For example, they generally permit credit transfers and joint degrees, but place collaborations of intermediate intensity off limits through requirements that institutions offer the full complement of compulsory courses internally. Box 4.1 discusses this challenge with respect to a policy option under consideration in Finland.

Quality assurance for international collaborations

Differences in QA regimes across jurisdictions can present a major challenge for collaboration that has implications for both the sending and receiving countries and has parallels to collaboration within jurisdictions between institutions of different types (Ossiannilsson et al., 2015).

As the OECD's 2005 Guidelines for Quality Provision noted, national level QA and accreditation systems are highly uneven and this can create gaps in QA for cross-border programmes (ACE, 2015). Moreover, the OECD and the United Nations Organization for Education, Science and Culture (UNESCO) have observed that national QA and accreditation schemes often do not cover cross-border higher education, which can either prohibit transnational education (withholding licensing, accreditation and/or funding) or raise risks of students receiving poor QA and accreditation, bad information, and ultimately weak instruction (OECD/UNESCO, 2005).

The OECD/UNESCO Guidelines for Quality Provision in Cross-Border Higher Education recommend that governments establish appropriate systems "of registration or licensing for cross-border higher education providers" (Ossiannilsson et al., 2015). QA and accreditation bodies should also co-ordinate, including through the development of bilateral or multilateral recognition agreements and strong mechanisms for information sharing. They may additionally pursue joint assessment projects to facilitate the comparability of their evaluation activities. Similar considerations apply to relevant academic recognition and professional bodies.

Box 4.1. Should Finnish higher education institutions be permitted to award a degree in a field for which they offer less than a full study programme?

Finland's current legal framework allows higher education institutions to arrange for their students to complete study units at collaborating institutions (or even develop joint or dual degree programmes). However, institutions must offer the full complement of courses necessary for their students to complete their full study programmes without attending other institutions, including all compulsory study units and sufficient optional study units. One policy option under consideration is to reverse this and permit institutions to offer study units that are required for their study programmes exclusively through a partner institution.

If adopted, this policy could yield some efficiency gains in time by allowing institutions to systematically co-ordinate their offer of courses. Institutions could also achieve further disciplinary specialisation, potentially with each focusing their provision in an area of comparative advantage – where their expertise and enrolments are strongest – and discontinuing provision in other areas. This specialisation could improve quality of instruction by directing students to study outside their home institution under instructors who are more expert than those locally available, and/or enhancing their access to instruction that is not locally available at all.

However, this policy of "external provision" would imply risks. Rather than placing exclusive responsibility for the integrity of the students' academic programmes with their home institution, it could disperse responsibility across institutions and thereby weaken accountability. Moreover, collaborating institutions would need to adapt the shared provision to the needs of the participating students, with respect for example to location and timing of provision and sequencing and alignment of course content, which would require more intensive co-ordination than they may be accustomed to.

Measures under the current proposal would mitigate some of these risks. An institution obtaining sections of its curriculum from a partner would remain fully responsible for the contents and quality of instruction in the study programme for which it awards a credential. Institutions sharing instruction in this way would also be required to share the same learning objectives for the study unit, and the institution delivering the study unit would have to make the course available to its own students as well as those of its partner.

Promoting joint degrees across European countries was a key objective of the Bologna Process, which spurred considerable efforts to strike down legal and regulatory barriers (QAA, 2015). European Higher Education Area (EHEA) countries now collaborate extensively in ways consistent with the OECD/UNESCO guidelines. Key initiatives include the Multilateral Agreement on the Mutual Recognition of Accreditation Results regarding Joint Programmes (MULTRA), the European Approach for Quality Assurance of Joint Programmes based on the Standards and Guidelines for Quality Assurance in the EHEA (ESG) and the Qualifications Framework for the EHEA (EQAR, 2017; New Zealand Productivity Commission - Te Komihana Whai Hua o Aotearoa, 2017). The European Approach relies on QA by an agency registered with the European Quality Assurance Register where external programme-level accreditation is mandatory, and self-accrediting institutions do not require "external evaluation or accreditation procedures at

the programme level." Accreditation agencies each recognise the institutions accredited by the other, including the delivery of programmes within their jurisdiction.

UK rules demand that institutions must apprise themselves of the legal and regulatory frameworks of all countries in which they are operating for joint programmes, as well as franchise or validation arrangements (QAA, 2015). As well, legal restrictions typically mean students must complete requirements of both jurisdictions for UK institutions to award a credential, even in cases of less intensive dual degrees. In some cases, these include non-academic national or cultural requirements.

The 2012 Mapping Internationalization on United States Campuses survey (in ACE, 2015) found that the large majority of joint programmes between US and foreign institutions were accredited in at least one of the countries and 51% in both countries. Another policy option is for accreditation bodies to unilaterally accredit institutions in other jurisdictions, but this may be expensive and risky (ACE, 2015).

Quality assurance for online instruction

Recently, steering agencies and institutions have given considerable attention to QA in online learning (Gaebel et al., 2014; Online Learning Task Force, 2011). Blended learning typically fits well within existing QA frameworks. However, removing QA barriers is viewed as a prerequisite for the development of high-quality online instruction, and many related policies are relevant to collaboration more broadly (Carey and Trick, 2013).[9]

A 2015 cross-national review identified four approaches to QA and accreditation for online and distance education (Ossiannilsson et al., 2015):

- The creation of specific, comprehensive criteria
- Mainstreaming into general QA, often after updating or reviewing of existing criteria
- Hybrid/customised systems, where there is a standard core applicable to all types of delivery and then additional policies specific to distance and online provision(See also Picciano, 2015)
- Systems that have not considered the impact of e-learning on their criteria, sometimes with perverse results such as limits on classroom size or requirements for physical facilities not needed for e-learning.

The Netherlands has relatively restrictive policies affecting online learning, as previously noted (de Boer, 2017). Ossianilsson et al. (2015) refer to the United Kingdom Quality Assurance Agency (QAA) as an exemplar of a liberal approach to online learning. Following consultations in 2010-11, the QAA updated its codes to contain no requirements specific to distance and online delivery, as discrete from in-person instruction, whereas previously the code of practice relating to Collaborative Provision included specific references.

In general, MOOCs are not credit bearing and therefore not subject to QA, which has allowed them to be an area for institutional experimentation and learning in online instruction, with reputational pressures promoting strong quality (EADTU, 2016b). However, offering credits is a key challenge for MOOCs to develop further and offer consolidation benefits to higher education systems. In the Netherlands, the NVAO expects institutions will use MOOCs in their programmes, but they do not see these courses playing an independent role in the system (EADTU, 2016a). The Dutch

government has set a goal for all the country's institutions to recognise each other's MOOCs by 2025 (EADTU, 2016a).

One policy approach may be for QA bodies to begin assessing and accrediting online programmes and courses even from outside their local jurisdiction (Carey and Trick, 2013). To ensure that institutions would accept these credits, state legislators in California and Florida previously introduced bills to require that publicly funded universities accept credits from approved online providers, although the strength of the quality review backstop was widely questioned (Carey and Trick, 2013). In the Netherlands, institutional exam committees must determine whether to recognise credits within a programme or for admissions, which obligates them to assess the quality, level and content of other institutions' online programmes (de Boer, 2017). The country's QA agency has collaborated with European peers to help develop the E-xcellence instrument to assess online and blended learning for use by institutions.

4.2.3. Licensing of programmes and institution types

In many cases, governments have licensing authority to permit that institutions offer certain academic programmes and degrees, or adopt an institution type. These policies establish framework conditions for CAM, but may also be used as direct instruments.

Governments may incentivise CAM through permission to offer credentials in certain fields. The Government of Finland enticed the Universities of Joensuu and Kuopio to merge partly with contingent permission to offer business degrees (Vartiainen, 2017). By establishing the Bachelor of Nursing Science as the entry credential for practice as a nurse, the Province of Ontario (Canada) forced the colleges that had previously been training nurses to partner with degree-granting universities (Boggs and Trick, 2009). A proposal in another jurisdiction was to consolidate several institutions' programmes in a professional field into a single offering, but to favour collaborative proposals in determining what institution(s) would deliver it.

More often, however, government instruments relate to credential types. Many policies require collaboration to provide certain types of degrees, including across binary divisions. In Flanders, *associations* aimed to help University Colleges (UCs) *academise* their 2+2 degree programmes, by better integrating research in collaboration with universities (Huisman and Mampaey, 2017). The policy promise was that institutions that did not fulfil *academisation* criteria would lose the right to offer academic degrees, though in the end the degree-type was fully transferred to universities. Similarly, in the 1990s, Sweden required UCs to collaborate with universities to provide doctoral training, and California's Master Plan has only allowed California State University (CSU) campuses to offer doctoral programmes in collaboration with the University of California (UCalifornia) system, with a recent exception for practitioner-oriented programmes in select fields (Miller, 2017). California's Master Plan also regulates direct admissions from high school and requires that UCalifornia institutions offer more courses in the last two years of undergraduate university programmes than the first two. These policies channel students into the California Community College for their first two years of study, but then promote many transfers into the UCalifornia or the CSU with support from diverse institutional, system and state initiatives.

Many jurisdictions have prohibited more intensive forms of CAM across institution types, including Finland, Germany, the Netherlands, and Norway until the early 2000s (de Boer, 2017). This policy may seek to preserve mission differentiation, or reflect a view that mergers across the binary divide may be a "short-cut" to obtaining university status

without commensurate quality (Skodvin, 2014). The Norwegian government simply refused to authorise the legally admissible merger of four UCs with the University of Tromsø in 1996, whereas in Finland, the prohibition on cross-binary mergers is legislated. Other jurisdictions have allowed mergers across institution types, including Australia (in the 1980s and 1990s), Norway (since the early 2000s), and Sweden. Interestingly, Finland is considering shifting its approach, as discussed in Box 4.2.

Tightening or loosening institutions' ability to change institutional status can also have important impacts on institutional motivations to merge. This reflects partly the established trend for other higher education institutions to seek university status, related in large part to the drive for prestige (Goedegebuure, 2012). Governments in Australia, Ireland, England, and Romania have used permission to change status as a direct measure to encourage mergers, whereas in Norway and Sweden indirect measures affecting changes in status have had idiosyncratic effects.

Governments in Australia and Ireland have deliberately used changes in institutional status to instigate mergers. From 1987-1991, Australia abolished its binary division and its Colleges of Advanced Education (CAEs) and used mergers to create the new unified universities. Similarly, Australian CAEs had also formed in the 1960s and 1970s largely from colleges merging to gain the status and thereby access to federal funding and gain the ability to offer more advanced degrees (Harman, 2000). In Ireland, the government created the status of Technological University specifically to encourage IoTs to merge. If IoTs did not pursue the new status they risked being left behind. HEFCE (2012) also reports that a new rule allowing institutions that surpassed an enrolment threshold to obtain university status motivated at least one merger in England.

In contrast, the Norwegian government did not intend to break down the binary system or encourage mergers when it changed its policy to allow colleges to gain university status in the early 2000s. Nevertheless, the policy had this effect because colleges sought mergers to pursue the significant benefits of university status, such as self-accreditation of graduate programmes, competitiveness for talent and profile (Kyvik and Stensaker, 2016). Ironically, a later government blocked college conversion to university status and then tightened requirements to maintain university and college status within a strategy to encourage further institutional consolidation (European Commission, 2016b). In Sweden, many considered that the various policies to relax differentiation between universities and UCs in the 1990s reduced collaboration between these institutions, beyond simply the end of an explicit requirement for collaboration in doctoral programmes.

In a unique approach, outlined in greater detail in the policy profile, Romania is classifying and ranking institutions to encourage CAM. Institutions with higher classifications gain prestige, but also advantages in delivering graduate programmes and potentially receiving additional funding. The algorithm used to determine classification aims to favour certain forms of CAM.

Box 4.2. Should Finland permit mergers between universities of applied science and research universities?

Separate acts currently regulate Finland's universities and UAS. Mergers across the two institution types are not permitted, but discussions are underway about removing this restriction and allowing the creation of hybrid institutions.

Hybrid institutions share and combine the distinct pedagogical orientations of UAS and research universities, and offer learners more diverse pedagogical options than at present, especially in areas of disciplinary overlap. Mergers could also achieve efficiencies. Recognising that employment protections greatly affect institutions' ability to remove redundancies, the long-term scope of these efficiencies would depend on the potential to combine administration, support services, and facilities, and on whether there is duplication in instructional staff. Differences in the instructional workforces of UAS and research universities suggest limited potential for reducing academic staffing.

Mergers between UAS and research universities would also permit further consolidation of Finland's higher education system to take place among geographically proximate institutions, instead of creating more physically dispersed multi-campus institutions. Nearby institutions that merge are typically more successful in achieving their goals for improved instruction and economic efficiencies than those that are distant.

However, the different missions, governance practices, stakeholders, and educational philosophies of UAS and research universities could be difficult to align or harmonise, and lead to protracted conflict. The applied and professional orientation of UAS programmes may also lose emphasis and priority within merged institutions, leading to a loss of diversity in Finnish higher education. Finally, mergers could stimulate demands to align the legal rights, working conditions and promotion structures of employees, which would be administratively complex and might be costly to the point of greatly mitigating sought after efficiencies.

Other licensing policies with international implications may include licensing rules regarding the ability to offer degrees in collaboration with foreign providers, admissions guidelines, and recognition of joint degree credentials (JDAZ Project Team, 2015). Previously some jurisdictions have strictly prohibited joint delivery of education with foreign institutions, but many of these policies have been relaxed in recent years (e.g. in South Korea), though one constraint to promote collaboration that may remain in some cases is a requirement that foreign institutions within a jurisdiction deliver programmes with a domestic partner institution (New Zealand Productivity Commission - Te Komihana Whai Hua o Aotearoa, 2017; Nuffic, 2013). Different institution types or jurisdictions may also be subject to different framework guidelines for admissions that institutions must reconcile to deliver joint degree programmes (JDAZ Project Team, 2015). Finally, in terms of recognition governments have been negotiating agreements to recognise degrees provided in different jurisdictions, such as the Lisbon Recognition Convention, and further progress in this endeavour will be essential to facilitate the provision of international joint degrees (JDAZ Project Team, 2015).

4.2.4. Intellectual property

The fundamental challenge posed by Open Educational Resources (OER) and other open principles is to shift default policies from "closed to open", "proprietary to collaborative"

and "restricted to accessible" (Stacey, 2013). This shift raises complex issues of intellectual property and privacy (Online Learning Task Force, 2011).

Creative Commons (CC) licenses are a widely understood rights framework for materials' provision and use adopted in 70 countries as of 2014 (EADTU, 2016b; Touzé, 2014). The CC framework can permit rights to copy (attribution – BY), modify or derive (No derivative works – ND), and redistribute (Share alike – SA) works, or to use them for commercial purposes (NC), provided that the author is cited. These different approaches may mix in six ways, basically creating six different types of licenses, but licenses generally correspond to CC BY and CC BY SA. Material owners may surrender their rights with or without remuneration.

These licenses must fit within jurisdictions' legal frameworks. To provide some sense of legislative constraints on OER, the literature review consulted documents on France, Germany and the US, with findings summarised at greater length in policy profiles in Annex B.

Germany has the most restrictive intellectual property legislation with no fair use clause and considerable legal conflict surrounding potential violations. France and the US, on the other hand, have amended their legislation in recent years to better support use for pedagogical purposes, although in France the legislation continues to attract criticism for its complexity. The French and German governments also negotiate with copyright holding bodies to facilitate access. Yet, one author questions whether the dysfunction of Germany's copyright legislation has not perhaps boosted the development of OER (Orr et al., 2017). From this view, the ease of sharing resources and information online is what has most created copyright difficulties, and OER is emerging as a critical solution in the absence of others.

Our United States policy profile (Annex B) highlights some of the implications of copyright rules for online instruction. Basically, online education in the United States can use the intellectual property of unaffiliated parties where they fulfil certain requirements, which include protecting it from illegitimate use (in Butler, 2016). Some institutions have found these requirements difficult to meet, and they clearly raise costs, especially for for-profit providers, including many MOOCs.

Perhaps more significantly, online courses are going to require that institutions and faculty develop a new ownership and revenue sharing model, including new conflict-of-interest and conflict-of-commitment policies. At most US institutions, for example, faculty own the copyright for course materials, lectures and textbooks that they produce. Institutions will need some ownership rights over related intellectual property, however, to justify the considerable investments to develop high-quality online courses. Otherwise, it is unclear whether institutions can modify courses without faculty permission, and what occurs after faculty leave the institution. In terms of MOOCs, at least one provider has left ownership with the instructor and institution and asked for a non-exclusive license to the content, which resolved ambiguity for the MOOC platform but left institutions and instructors still having to determine their own relationship (Butler, 2016).

The Australian Government operates a small secretariat called the National Copyright Unit, which is responsible for copyright policy and administration in the Technical and Further Education and school sectors (Open Policy Network, 2016; The National Copyright Unit, 2017). The National Copyright Unit helps to co-ordinate the federal, and state and territorial governments, as the former is responsible for copyright protection and the latter two have more direct responsibility for education. It also informs institutions on

copyright issues and has adopted a number of activities encouraging institutions and students to use open access resources and encouraging creators of educational content to make their materials available under CC licenses. All State and Territory Departments of Education have also agreed to license their website and publications under CC, as a way to lead by example.

4.2.5. Privacy protections

The German case also illustrates how privacy legislation can be relevant to OER, online education and the development of new technologies relevant to collaboration. Europe has among the strictest privacy laws in the world. To obtain data, researchers generally must obtain the consent of the subject for a specific purpose, and institutions have data protection officers to ensure compliance with regulations. This has particular implications for learning analytics, which can provide deep insights into learners' character and capabilities, as well as collaboration in assessment (Orr et al., 2017). There are also strict limitations on storing data outside the European Union, which may restrict possibilities for collaboration with US firms or presumably institutions.

Of course, many collaborative initiatives will imply sharing of personal data, for example for enrolment in joint degrees. In essence, privacy protections can rule out certain collaborations, and mean institutions must pursue others only with great care.

4.3. How governments intervene: funding instruments

Governments' operational and capital funding policies can create framework conditions in which institutions decide whether to pursue CAM, and the paper will first consider operational and capital funding policies principally with this lens. For the most part, however, governments appear to use funding policies as direct inducements for collaboration and consolidation, and the paper will review the provision of: innovation and ad hoc funding; financing to platforms for collaboration; excellence initiative funding; funding for international joint degree programmes; funding with conditions relating to OER and Open Science; and conditional grants for research. A common challenge for funding mechanisms is to balance incentives for collaboration and competition. Many mechanisms seek to address this by creating structures whereby institutions that become more competitive for funding if they collaborate.

4.3.1. Operational and capital funding

The basic financial circumstances of institutions shape their interest in CAM, but in unpredictable ways. Survival mergers, for example, can naturally result from lower funding levels, but these may also make it difficult for institutions to pursue and finance major restructuring or even less intensive collaborations. In Denmark, on the other hand, relatively generous financial conditions were important to facilitating the concentration of universities and research institutes. Even at the ground level, Short and Stein (2001) argue that faculty have "little motivation to collaborate when programs appear to be doing well".

The design of mechanisms for distributing institutional funding can also affect institutions' interest in CAM. In part, this is again through their basic effects on institutional balance sheets. Historical models are fundamentally less conducive to change than dynamic funding formulae, including in the area of consolidation. Funding formulae that emphasise enrolment can encourage institutional mergers involving smaller

institutions that have comparatively high fixed costs and less prospect of growing their enrolment.

The details of how formulae distribute enrolment-based funds can also shape institutional incentives. Under practically all funding models, institutions receive little or no revenue for accepting transfer credits (Carey and Trick, 2013). As well, Ireland's restrictions on funding for part-time students studying off-campus has been identified as a barrier to the growth of online education and thus, potentially, to new forms of institutional collaboration (EADTU, 2016a).

Many funding models have also shifted to a greater emphasis on performance, which can often imply institutional competition (de Boer et al., 2015a). Reviews of funding approaches note that performance-based criteria for allocating institutional funding can cause institutions to closely protect their position and neglect to reflect and act on their position within the system, including through CAM (de Boer et al., 2015b; Claeys-Kulik and Estermann, 2015). This can also be the case for one-time funding for infrastructure improvement or research (NCRIS Evaluation Team, 2010). An evaluation of New Zealand's Performance-Based Research Fund Quality Evaluation found that the programme had a negative impact on collaboration across institutions (in Fraser et al., 2015). In Sweden, however, Ljungberg et al. (2015) indicate that increasingly competitive funding, especially in research, encouraged institutional mergers. Encouraging or discouraging collaboration may be an outcome of how these systems measure performance. For example, the New Zealand Productivity Commission (2017) found that the way one performance metric measured completion discouraged collaboration on student transfers by recognising only one institution per credential granted.

Some governments have also created collaboration-related performance funding instruments, which have formed the basis of conditions for operating funding. France indicated that it expected institutions to outline collaboration activities in funding contracts in 2004, and Finance et al. (2015) note coinciding performance contract timelines helped with joint planning among the institutions that eventually merged into the University of Lorraine. At least one Dutch alliance was proposed and then evaluated based on the institutions' performance agreements (de Boer, 2017). In terms of non-profiled countries, Italy's 3-year performance contracts with universities have addressed collaboration among universities and rationalisation of the academic offer by redistributing courses at the regional level (Claeys-Kulik and Estermann, 2015). The Italian government provides funding partly upon agreement and partly upon fulfilment of targets, but the affected envelope has been limited to just 2.5% of all public funds that institutions receive. Institutions have been allowed to choose in what areas to make commitments, and establish starting points and targets for performance measurement. In Scotland, bilateral outcome agreements have generated annual targets in priority areas, which have included indicators of university-college collaborative projects to support graduates with Higher National Diplomas – a semi-vocational or semi-professional higher education credential equivalent to the first two years of a first-cycle university degree (de Boer et al., 2015b).

Governments may also provide funding directly to collaborative entities or initiatives instead of individual institutions. France, for example, has begun providing significant funding to COMUEs (Boudard and Westerheijden, 2017). The New Zealand Productivity Commission (2017) also recommended providing direct funding to collaborative programmes, while Ireland has committed to providing special funding for joint

programmes (Finnegan, 2015). Distribution of funding to constituent members of federations can also affect the depth of integration (Harman and Harman, 2003).

In many cases where governments seek to promote CAM for purposes of system restructuring, they implicitly or explicitly offer compliant institutions advantages in terms of operating or capital funding, and threaten penalties for non-compliant institutions. Institutions that pursued mergers in Australia's third merger wave (1987-1991) received advantages in the distribution of student spaces (which determined operating funding) and new capital funds, as well as permission to recruit international students whom they could charge higher fees. Danish institutions also understood that mergers would position them better as research funding was to increase in connection with the country's Globalisation Strategy (Aagaard, Hansen and Rasmussen, 2016). France allowed institutions that participated in aggregations called *Pôles de recherche et d'enseignement supérieur* (PRES) to hire additional personnel. Romania has promised to develop a formula to favour consortia and merged institutions in the distribution of operating grants (Munteanu and Călin Peter, 2015). Other countries that have used similar approaches include Ireland, Norway, and the United Kingdom (Harman and Harman, 2003). In terms of penalties, the Australian Government threatened a complete denial of funding to institutions that did not pursue mergers as instructed in the second merger wave (1981-1987), and Sweden removed funds for "non-utilised student spaces" to encourage the absorption of Gotland UC by Uppsala University (Karlsson and Geschwind, 2016, p. 153).

Finally, differences in funding schemes between institutions, across institution types, or across different jurisdictions, can also be an important barrier to various forms of CAM (JDAZ Project Team, 2015). Challenges can include not only direct institutional grants from governments. Carey and Trick (2013) identify eligibility for financial aid at diverse institutions, including for online modalities can be a challenge for some collaborative initiatives. Institutions often also have to manage different fee structures, at times working around government regulations (Dicenso et al., 2008; Stein and Short, 2001).

4.3.2. Innovation funding streams and ad hoc support

Governments often provide funding to help defray the costs of CAM. Where funds to cover CAM costs are recurrent, the general mechanism is "innovation funding" streams, although these may help institutions to pursue change initiatives other than CAM as well. Such funds may be in place indefinitely or at least for multiple application periods.

England, Ireland and Wales are examples from the policy profiles of jurisdictions offering innovation funds. The English Catalyst Fund is a particularly interesting initiative, as the programme issues calls for applications to different sub-envelopes to pursue different policy objectives. Other jurisdictions are pursuing similar initiatives, including those connected to framework or performance contracts, as indicated in Box 4.3.

Even in the absence of innovation funds, almost all of the policy profile jurisdictions have provided targeted one-time support to cover costs associated with institutional CAM. These funds typically take the form of grants, but may also be loans as with an Australian Government fund to support staff buy-outs. One interesting example of ad hoc support was Swedish government funding to support shifting of programmes between Växjö University and the UC of Kalmar in 2002/03, a step on the path towards the institutions' eventual merger (Geschwind et al., 2016). To avoid duplication and local competition for students, Växjö took on all modern languages except English while UC Kalmar concentrated biology instruction. Jurisdictions that have not offered funds for

implementation (e.g. Ireland, Romania) have promised to favour co-operating institutions in the distribution of operating funding.

Funding may support strictly costs associated with CAM, or complementary investments notably in infrastructure. In Ontario (Canada), for example, the Province provided capital grant support to collaborations between universities and colleges in 1994 and 2000 (Boggs and Trick, 2009).

Box 4.3. Funding for institutional collaboration in Austria, New Zealand and Nova Scotia

In Austria, performance contracts must address collaboration with other institutions and fully 14% of funds from the country's performance funding stream (the Hochschulraum-Strukturmittel) tied to these contracts are dedicated to supporting collaboration activities in "teaching, research, advancement and appreciation of the arts, and administration" (de Boer et al., 2015b; Claeys-Kulik and Estermann, 2015). The funding may cover up to one-third of the costs of projects with UAS (referred to in Austria as *Fachhochschulen*), industry or other partners, and most favours projects to establish clusters and graduate schools, referred to as excellence structures.

New Zealand's Tertiary Education Commission is offering Joint Ventures and Amalgamations Projects funding of up to NZD 1 million (New Zealand Dollars) per year to support CAM among industry training organisations for restructuring purposes (Tertiary Education Commission - Te Amorangi Matauranga Matua, 2017). Industry training organisations may be required to share information with the rest of the sector regarding the funded programmes. From 2007 to April 2014, the Regional Hub Project Funds of New Zealand's National Centre for Tertiary Teaching and Learning Excellence – Ako Aotearoa – also provided grants supporting to completion 44 projects involving collaborations across institutions, out of 122 projects funded in total (Fraser et al., 2015; Honeyfield and Fraser, 2012). Project objectives included aiding the development of guidance for novice instructors. A 2015 evaluation found that institutions pursued many of the collaborations specifically to improve their chances of obtaining funding, and that all the collaborations reported deriving value, including by fostering of communities of practice (Fraser et al., 2015).

In Nova Scotia (Canada), the 2012-2015 Memorandum of Understanding between the provincial government and the universities identified "expanded collaboration to reduce costs while maintaining or enhancing program quality" as a key priority (The Province of Nova Scotia and The Council of Nova Scotia University Presidents, 2012). Connected to the framework agreement were innovation funds worth CAD 25 million over three years (equivalent to approximately 3% of operating grants) to support initiatives that could sustainably reduce the system's annual cost structure by CAD 25 million.

Conditions on innovation and one-time funds vary considerably. The Higher Education Funding Council of Wales (HEFCW) set conditions to shape institutional CAM, including through the setting of ex ante targets that institutions had to meet or risk the government clawing back money. In contrast, Flanders set few if any conditions on funds to support "associations". Criteria may also change over time or not be enforced. In Nova Scotia, ultimately many initiatives that the innovation fund supported did not target cost reductions as originally planned, and the Auditor General subsequently reported disappointment with the limited extent of savings (Nova Scotia Department of Labour

and Advanced Education, 2014; Withers, 2015). Seemingly lacking institutional proposals that would fulfil the fund's original objectives, after the first call for proposals many initiatives instead sought to improve access or explore transnational education opportunities. Finally, funding may have deadlines, even when in support of CAM that are government-mandated without explicit deadlines (e.g. Finland) (Nokkala et al., 2016).

4.3.3. Financing platforms for collaboration

Creating an appropriate administrative infrastructure is a common challenge for institutional collaboration. Some governments have addressed this challenge by financing external agencies with a mandate to facilitate institutional collaborations and alliances, or giving this mandate to agencies that they initially created for broader purposes. Institutions may jointly govern these agencies without government involvement, or ministries may be closely involved in governance. Many of these platforms focus especially on facilitating the use of new information and communications technologies.

In Annex B, the policy profile of France highlights the government's initiatives to create OER and MOOC platforms, to provide guidance on OER development through its National Digital Council, and to support skills development among institutional staff. Based largely on these funding initiatives, the Global Open Policy Report considers France to be the world leader in terms of scope and implementation of OER, with other strong performers including Argentina, New Zealand, Poland and South Korea (Open Policy Network, 2016).

Funding agencies in the United Kingdom provide most of the financing for the Joint Information Systems Committee (JISC), which supports institutions with shared digital infrastructure and services, facilitates joint procurement for ITC products, and provides expert advice (JISC, 2017). JISC and the Higher Education Academy redistributed to institutions GBP 13.5 million (British Pounds) from HEFCE over three years to promote sharing and reuse of learning services and boost the higher education system's reputation by disseminating UK-developed learning resources internationally (Stacey, 2013). The UK Government is also supporting the Futurelearn Initiative, a consortium of 17 universities, which is developing a MOOC platform to compete with those based in the United States (Carey and Trick, 2013). Annex B provides more details on these and other initiatives with respect to OER.

Other European countries have also promoted the development of platforms. German initiatives have taken place at both the federal and state levels and involved creating platforms for accessing OER and also training users, as detailed again in Annex B. The Norwegian government has funded the Norwegian Agency for Digital Learning in Higher Education to help institutions offer flexible distance education options (EADTU, 2016a). The agency's activities now emphasise the use of educational technology not only for distance and flexible learning, but also for campus-based instruction, and it has facilitated sharing of best practices and the use of joint resources to negotiate access to e-learning tools and solutions (Gaebel et al., 2014).

In Canada, the Government of British Columbia finances and oversees BCcampus, which was established largely to assist institutions in adopting new technologies. BCcampus "evaluate[s], facilitate[s], and collaborate[s] on complex and innovative postsecondary education projects […] through partnerships with […] institutions as well as government agencies and non-profit groups" (BCcampus, 2017a, p. 3). The agency's three lines of services are: open education; learning, teaching and educational technology; and collaborative projects. In this third area, it "provides project management services,

technological support, instructional design and development, stakeholder co-ordination, and expertise for the development of shared curriculum and learning resources", but activities in the other two areas of services also involve extensive institutional collaboration (p. 6). Annex B provides a more detailed explanation of BCcampus's Online Program Development Fund, which invested USD 9.5 million over nine years to promote the production and reuse of OER, with a special emphasis on inter-institutional collaboration. Another programme supported by BCcampus is WriteAway; a service that allows students at 15 institutions to submit essay drafts online and receive tutor feedback within 48 hours (WriteAway, 2017).

Not all platform initiatives are focused on developing information and communication technology based solutions. For example, the Canadian Institutes for Health Research (CIHR) and the Canadian Health Research Services Foundation, both federal agencies, provided 10-year funding beginning in 2001/02 to support the establishment of four collaborative regional training centres (Dicenso et al., 2008). Universities jointly established each centre to deliver graduate level instruction either through joint programmes or by pooling courses, often online, in areas such as applied health services research, nursing, nursing administration and public health. Funding typically supported course development, but not teaching costs. In practice, the training centres did rely heavily on information and communication technologies, including online instruction, but this was less their overall orientation than in the other highlighted cases.

4.3.4. Excellence initiatives

A recent EUA report reviewed exception public funding initiatives between 2000 and 2014 that aimed to raise the performance of certain higher education institutions to higher levels of excellence (Bennetot Pruvot and Estermann, 2014). The study identified 11 schemes in 10 European jurisdictions. Similar schemes pursued elsewhere include South Korea's Brain Korea 21 programme and China's 985 Project.

Typically, excellence funding mechanisms are one-time or otherwise time-limited competitive funds to which institutions can apply. Projects are often selected by international jury panels including high-level academics through multi-step processes. There are often significant costs associated with preparing and assessing applications, while evaluation of project implementation has been generally limited.

In many cases, excellence schemes represent an important break from patterns of equal treatment of higher education institutions across a system. They perhaps acknowledge but certainly expand differences in status. In most cases they focus on strengthening research, and research is seen especially as necessitating a concentration of financial resources, infrastructure and talent, as opposed to even distribution across a system. Key objectives include enhancing the international competitiveness and visibility of a system, system restructuring, supporting institutions to secure greater private funds.

Many excellence initiatives also promote institutional CAM as an important element of their broader efforts. In some cases, they closely complement concentration measures (e.g. Finland, France). In many instances, they may focus on generating thematic "clusters". They often require that institutions develop regional groupings with a common strategic vision and even new governance structures. These governance structures typically include representatives from the different bodies participating in the excellence initiative, not only from the institutions but from private companies, governments and other research organisations.

In terms of specific examples, the creation of Aalto University was simultaneously a merger and excellence initiative with heavy government support. France's 2008 Plan Campus programme explicitly required collaborative proposals with regional structuring goals, and the 2009 *Initiative d'Excellence* (IdEX) also sought to promote CAM. Spain's 2009 Campus of International Excellence Programme sought "to spur the aggregation between universities and between universities and other institutions around a common project and campus", in the form of systematic collaborations. Collaborations with independent research centres favoured university candidacies for Germany's *Excellenzinitiative*, resulting for example in the creation of the Karlsruhe Institute of Technology via merger (Koschatzky and Stahlecker, 2010). The Brain Korea 21 programme in operation since 1999 has required receiving institutions to develop research consortia consisting of a leading university and other partner institutions (Lee, 2015). Finally, Cai and Yang (2016), for example, report that China's Project 211 and Project 985 have built pressure for institutions to merge, as a means of achieving greater prestige and comprehensive orientations.

4.3.5. Funding for international joint degree programmes

Finally, many governments and regional agencies have also provided targeted funding for international joint degree programmes (JDAZ Project Team, 2015). Nationally funded initiatives have included the Campus Asia programme, "the French-Italian University, the Finnish-Russian Cross-Border University and the German-Dutch EUREGIO Program" (JDAZ Project Team, 2015, p. 16). Examples of regional initiatives include the Nordic Master's Programme, the Pan-African University, and the Erasmus Mundus Joint Master's Degree (EMJMD) strand of the European Union's Erasmus+ programme, which involves institutions in three or more countries with funding focused largely on scholarships for students participating in the joint degree programmes (European Commission, 2016c). Single-jurisdiction programmes require support from overall operating funds, although they may receive innovation fund or ad hoc support for set up.

4.3.6. Funding conditions related to open educational resources and open science

Many analysts consider that building a financing model is critical to the development of OER (Annand and Jensen, 2017; Stacey, 2013). Among the most promising potential policies to increase the development of OER is to require that educational materials developed using public funds must be made available to openly licensed (Stacey, 2013). The basic principle is that the public should have access to resources that it paid for. Governments in many jurisdictions have begun requiring CC sharing of resources generated through public funding programmes

The single largest funding project to significantly promote the expansion of OER was the USD 4 billion United States Trade Adjustment Assistance for Community College and Career Training program. The programme sought to expand training opportunities for Americans in the aftermath of the financial crisis, but included a requirement that grantees make all training resources and copyrightable works generated using the funds available under a CC Attribution license.

The EUR 14.7 billion (Euros) Erasmus+ Framework programme of the European Union includes an open licensing requirement for educational resources, however external analysts suggest that the licensing standard used is insufficiently strict, such that the policy had had no visible effects as of 2016 (Open Policy Network, 2016). The European Union has also advised member states to support open availability of educational

resources developed using public funds, although as of 2016 no national governments had established such a policy on a large scale (Open Policy Network, 2016). Within Europe, the Dutch government has set a goal that by 2025 instructors should share openly all educational resources that they produce, and the German state of North Rhine-Westphalia has established conditions under one funding programme for OER, although this remains a modest initiative (de Boer, 2017; EADTU, 2016a; Orr et al., 2017).

From a North American perspective, Annand and Jensen (2017) suggest that the most reasonable and feasible means to align financial interests of intermediaries and final consumers in the textbook market would be for governments to decree that publicly funded institutions must include the cost of all learning materials in their tuition fees. In this case, institutions would have a strong incentive to use OER as they would retain all cost savings. This notion is partly predicated on the idea that faculty set the requirements for students to purchase textbooks, and it would be infeasible for the government to order them through their institutions to use OER.

Countries have adopted similar approaches to open research. In terms of leading countries in open research, the Global Open Policy Report has identified Argentina, Belgium, Canada and Japan, but in sheer scale, Europe has been the world leader in the development due largely to its use of funding conditionality (Open Policy Network, 2016). In 2008, the European Union applied an Open Access Pilot to 20% of the funds from its EUR 50 billion 7th Framework Programme for Research and Technological Development. Under the pilot, grantees were required to deposit either the publication or final manuscript of funded work in an Open Access repository after a six-to-12-month embargo period. In the EUR 80 billion 8th Framework Programme – Horizon 2020 – launched in 2014, the policy was extended to apply to all grant recipients. The European Commission has also recommended that states introduce open access policies for all publicly funded research, and as of 2016 fully 65% of funder policies and 38% of policies of related institutions required open access distribution of articles. Attention is now moving to what is called Open Science, and encompasses in particular the sharing of research data. In terms of public data, 71% of EU member states have adopted an Open Data Policy.

In the United States, the Executive Office of the President directed agencies with large research budgets to provide open access within 12 months to all publications reporting the results of research grants in 2013, building on a policy that the National Institutes of Health adopted in 2008. In 2015, Canada's major granting councils (CIHR, the Natural Sciences and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council) also introduced a requirement that all grant-supported publications be made open access within 12 months of publication (Open Policy Network, 2016). As in the US, this policy was first spearheaded by the health granting agency (CIHR) in 2008.

4.3.7. Grants for research and engagement

Governments have long provided extensive funding for research and engagement conditional on different forms of collaboration (Stein and Short, 2001). In research, these funds have much more often been focused on the level of individual academics or research teams than institutions, and many authors suggest they have had an impact in encouraging faculty to collaborate (collaborative applications do appear more likely to obtain funding) (Gazni et al., 2012; Shin et al., 2013). Some programmes have also supported research collaboration at the institutional level.

The literature review identified institutional research funding streams conditional on collaboration in Australia, California, Flanders, Ireland, the Netherlands, and Sweden focused largely on research infrastructure (de Boer, 2017). The Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS) has supported the development of institutional research infrastructure on the condition that researchers at other institutions be permitted access (NCRIS Evaluation Team, 2010). Similarly, only institutional consortia are eligible for Dutch research infrastructure funding under the Gravitation Programme, while Japan's national government has somewhat similarly supported Inter-University Research Institutes to support research activities that would be too expensive for a single university to undertake (de Boer, 2017; Yonezawa, 2017). Five different funding programmes under the UCalifornia Research Initiatives support expanded research collaboration across the system's campuses (Miller, 2017). Ireland's key programme has supported collaboration across institution types since 1999 (Harkin and Hazelkorn, 2014).

Many countries in Europe are also providing financial support to research on learning analytics, to help with the development of OER and online learning (EADTU, 2016a). One policy proposal has been to sponsor collaborative action research pilot studies to examine benefits and costs of emerging developments in online learning, with joint stakeholder commitment to scale up successful pilots as a condition of participation (Carey and Trick, 2013).

Other programmes have focused on joint staff appointments. In the Netherlands, the government and other parties have directly funded UAS positions called *Lectors* that are cross-appointed with universities, private companies, public-sector organisations, or other UAS (de Boer, 2017). The Dutch government also spent EUR 180 million over two years to support secondments of industry knowledge workers into universities, UAS and other "public knowledge institutions" for periods of up to 18 months. Meanwhile, South Korea's World-Class University programme has aimed to assist with the recruitment of foreign faculty, but also to strengthen collaboration by hosting elite foreign researchers at South Korean institutions (Suh, 2013). Investments in the programme totalled well over USD 1.5 billion from 2008 to 2013, funds were dedicated perhaps more to recruitment than collaboration. Japan, China and Chinese Taipei have pursued similar initiatives, while the European Union has also placed a particular emphasis on international faculty collaborations (Larivière et al., 2015; Shin et al., 2013).

Innovation funds often support engagement initiatives involving external partners, while governments have also implemented specific programmes to support joint engagement with industry. One cluster-based example is the Norwegian Innovation Clusters Programme (NIC) programme, which Innovation Norway, the Research Council and the state-owned industrial development corporation Siva have implemented since 2000 (Williams, 2017). The NIC programme distributes funding from the Ministries for Trade, Industry and Fisheries and for Local Government and Modernisation, and also provides "advice, training, networking and promotional assistance" (Williams, 2017, p. 14). Linking clusters with educational institutions is an explicit NIC programme goal, but many of its projects also have the effect of linking institutions, as in the case noted earlier of the Norwegian Centres of Expertise Seafood Innovation Cluster. In terms of platform-style programmes, Nova Scotia also provided initial funding to support the creation of "Sandboxes" as collaborations involving higher education institutions and the private sector, worth CAD 150 000 per sandbox per year for up to three years (Government of Nova Scotia, 2014). These sandboxes run various programming supporting students to become entrepreneurs.

5. Approaches to overcome strategic challenges

Tertiary institutions often enjoy substantial legal autonomy and strong support among stakeholders inside and outside their institutions. Thus, research indicates that successfully promoting collaborations, alliances and mergers (CAM) among tertiary institutions is typically not just an exercise of using the legal and financial powers of government, but an exercise in persuasion (Gummett, 2015). Studies of institutional collaboration and consolidation point to five challenges that policymakers face in achieving success: stimulating institutional initiative, supporting planning and implementation, securing stakeholder buy-in, concentrating resources, and achieving policy alignment.

5.1. Stimulating institutional initiative

Governments often aim to encourage institutions to initiate CAM themselves, thereby avoiding issuing directives or being perceived as "bullying". This approach also allows governments to preserve political capital, but also supports the most likely mechanism for institutionally-initiated CAM to be more successful: stronger buy-in from within institutions. Moreover, it permits institutions to shape CAM initiatives to be opportunities for their development.

There is a typical pattern across most programmes to restructure higher education systems through CAM, whereby governments first encourage and support institutions to implement CAM of their own accord before introducing more coercive approaches. Government approaches often proceed from initial reports recommending CAM, to the introduction of financial and academic incentives and supports, to directives and the identification of penalties for non-compliance. Similarly, governments often begin with general recommendations and incentives, but then target individual institutions if these do not respond as expected. Even where governments are not explicit regarding specific institutions, stakeholders can understand their implicit goals and often identify which institutions are most implicated.

This intensifying sequence incentivises autonomous action because institutions will often pursue CAM before they are imposed, so they have greater control over partners and other practical details. As authors from Ontario put it, institutional stakeholders are given the option to "do before you are done to" (Carey and Trick, 2013). In other words, initial communications represent implicit or at times explicit threats to which institutions have a choice as to how to respond.

Many concentration efforts from the policy profiles give clear examples of this sequencing, such as Denmark, Finland, France, Norway, and Wales. Each government initially invited institutions to propose CAM, while providing incentives. Subsequently, these governments acted more aggressively to promote further mergers through funding, regulation and political pressure. In terms of growing institutional specificity, this is most apparent in the Welsh case where the government became increasingly explicit regarding

specific institutions between 2002 and 2012, but also characterise Denmark and Norway's concentration processes. In Denmark, proposals for new institutional agglomerations that would have separated out parts of other institutions motivated institutions that would lose out to proactively pursue alternative merger arrangements (Aagaard, Hansen and Rasmussen, 2016). In contrast, the Australian Government did not issue formal invitations in the lead up to 1987, but clear signals indicated that it would impose mergers in the future.

Another obvious aspect of sequencing is to recognise that at the institutional level, CAM often intensify over time. At times, this may reflect leaders seeking buy-in from colleagues (Stein and Short, 2001). More widely, however, institutional actors need to learn to collaborate effectively, as it is typically not a part of academic training or in many cases standard practice.

Given this intensifying pattern, governments may support modest collaborations where their ultimate objective is for mergers. In France, the various combination of agglomeration and excellence initiatives outlined in the policy profile created many opportunities for institutions to work together and build towards more intensive CAM, as with the University of Lorraine merger. The Swedish government supported collaboration between Växjö University and the University College of Kalmar in 2002/03 to reduce programme overlap, then provided support to the merger completed in 2010 (Geschwind et al., 2016). Even unsuccessful proposals for funding to support collaboration may help build relationships and patterns of joint planning (Finance et al., 2015). In France and in Ontario, failed proposals contributed to the development of successful initiatives later (Boggs and Trick, 2009).

The misalignment of competitive incentives may spur government policy interventions to promote CAM, but authors note government efforts to shape competitive pressures can be as effective in promoting CAM as explicit incentives. Institutions acted much more aggressively than expected to maintain or boost their standing in the post-reform landscape during Australia's 1987-1991 merger wave, the mergers of Dutch *hogescholen* in the 1990s, the creation of "associations" in Flanders in the 2000s, and the creation of PRES and COMUEs in France in the 2000s (Boudard and Westerheijden, 2017; Goedegebuure, 2012; Harman, 2000; Huisman and Mampaey, 2016). Often, large institutions that were immune from policies establishing minimum enrolment thresholds still pursued "bidding wars" for partner institutions.

The Flemish case also demonstrates how institutional leaders can strengthen their position by shaping government initiatives to promote CAM (Huisman and Mampaey, 2017). According to Huisman and Mampaey, one university president greatly influenced the programme's design and courted the most partner institutions. This helped his university to build the country's largest association, leading it to greatly expand enrolment, in circumstances that might otherwise have reduced the institution's prominence. By comparison, the positions of institutions that acted less aggressively worsened. Other studies highlight how CAM can actually help institutions strengthen their position vis-à-vis governments and other stakeholders (HEFCE, 2012; Russell, 2017).

5.2. Supporting planning and implementation

The detailed academic, administrative and financial implementation of CAM at the institutional and departmental level is beyond the scope of this report. However, those

who study CAM note that effective implementation is critical in the success of CAM initiatives.

In a 2006 study of 52 US community colleges and universities involved in collaborations, Czajkowski (2006) found six key factors that were important to success:

1. Trust and partner compatibility
2. Common and unique purpose
3. Shared governance and joint decision-making
4. Clear understanding of roles and responsibilities
5. Open and frequent communication
6. Adequate financial and human resources.

Later research on 22 collaborations in New Zealand corroborated these findings, while noting that five of the factors relate to interpersonal connections between the collaborating parties (Fraser et al., 2015). These factors may not be relevant to all cases, but they are typically important. The challenge for governments promoting CAM is to pursue policies that foster these constructive factors. The following subsections will consider how governments can accomplish this firstly by helping ensure the effective assessment of collaboration proposals, and then by supporting effective implementation.

5.2.1. Assessing collaboration proposals

Available analyses suggest that before implementing a specific CAM, it is important to identify clear policy goals and properly analyse options. HEFCE (2012) details a series of preparatory tasks: options review, implementation cost analysis, business case preparation, risk analysis, and due diligence. Failure to pursue these activities seriously can undermine the quality of decision-making and the successful implementation of even justifiable CAM.

Often National Strategies identify CAM as an explicit priority for the higher education system in the lead up to governments implementing policy inducements. Ireland's 2010 *National Strategy for Higher Education to 2030* for example, identified clustering, alliances and mergers as key steps to develop "a coherent and sustainable system of [higher education] to meet the economic and social needs of the country, within its broad ambition to create an export-driven knowledge economy" (Harkin and Hazelkorn, 2014). Thematic reviews can also guide policy measures regarding CAM at the disciplinary level, even leading to mergers of institutions with narrow disciplinary focus. Ireland, for example, has implemented periodic reviews to inform planning across institutions in strategically important and high cost disciplines, and one such review led to the consolidation of teaching institutions (Expert Group on Future Funding for Higher Education, 2015). Using these strategic analyses to inform CAM initiatives can ensure these are well founded and aligned to the government's broader priorities.

The key test of any proposed CAM initiative is whether it allows institutions to accomplish a policy goal they could not accomplish separately. Again, CAM is not always the solution, and options review can consider whether other measures could better accomplish the policy goals being sought. HEFCE (2012) notes that this analysis should account for how the range of institutional activities, policies, opportunities and threats interact with the policy challenge and policy options, and should also consider the opportunity costs of potential policy approaches.

Typically, the implementation cost analysis, not options review, examines in depth the financial implications of one or more favoured policy options. CAM costs can relate to

buying out staff in cases of redundancies, harmonising pay and benefits, adjusting and renewing infrastructure, adapting ICT, restructuring other administrative procedures, and planning and communication. Where CAM requires the creation of a new brand, institutions may also want to invest heavily in promotion (Geschwind et al., 2016). Implementation cost analyses could also explore potential funding sources, such as different levels of government, multilateral funders, private donors and other private sector parties.

The business case complements the cost analysis and considers the prospects of efficiencies and economies of scale, often over the longer term. Often these reports aid implementation planning, but they may not be relevant where CAM do not seek efficiencies and savings.

Risk analysis and due diligence are critical due to the complex implications of many CAM initiatives. HEFCE (2012) considers that risk analysis should be undertaken throughout the planning and implementation of CAM as circumstances evolve, to help not only for determining whether to pursue CAM but to inform the sharing of risks between parties. Continuous due diligence in terms of auditing, as well as monitoring legal and academic implications, is also important, with the most complete investigation taking place during implementation planning.

In some cases, governments may consider themselves directly responsible for financial oversight of institutions and therefore implementation of many of these activities (Stensaker et al., 2016). In other cases, they can set expectations for institutions to implement these tests in advance of CAM, especially where they provide grants as incentives to collaborate or to help cover associated costs. In Wales, HEFCW funds supported institutions to develop CAM scenarios (Benneworth and Zeeman, 2017).

Nevertheless, HEFCE's (2012) review found the implementation of serious implementation cost analysis, risk analysis and due diligence was inconsistent in England and overseas. The literature suggests this is true across most policy profile jurisdictions. Timelines, costs, risks and other obstacles are often underestimated or deliberately understated as parties to CAM are already heavily invested and do not want to strengthen opponents' arguments (Bennetot Pruvot et al., 2015; HEFCE, 2012). Plans also may not address instruction as much as research and administration (Ursin et al., 2010).

The implementation of these measures can also be spur conflict. In a Norwegian case, for example, conflict arose surrounding a due diligence audit that an institution commissioned of itself and two prospective partners (Stensaker et al., 2016). The audit's results led the institution to terminate the merger, though the government argued the institution was impinging on its authority in ordering the audit and along with the other institutions questioned the audit's results.

One way in which governments may make it difficult for institutions to conduct these various tests is by setting exceedingly tight timelines. In Denmark, the timeline for institutions and research institutes to propose mergers that were integrated within the national plan was merely two months (Aagaard, Hansen, Rasmussen, et al., 2016, p. 81). It appears that short timelines may be necessary for political and economic reasons, but they can still imply important costs and risks down the road.

5.2.2. Implementation

When institutions decide to pursue CAM, HEFCE (2012) argues that they should develop joint implementation, strategic and/or business plans using the tests outlined above as key

inputs. Policies can then align to accomplish goals from the plan. Key plan elements can include:

- Clear objectives and measures of success based on a reasonable timeline
- Positioning within institutions' wider strategies and change goals
- "Break points" where CAM could be scaled back or abandoned if goals are not being met
- Appropriate decision-making structures for the CAM, including where applicable a timeline and process for appointing a governing body initiative with clear lines of communication and authority with the established institutions

Rothwell and Herbert (2015) consider the development of shared data and management systems as a prerequisite for successful collaboration in other areas, necessary so that the partners can share a "single version of the truth" Designing successful processes and structures can minimise the need for ongoing negotiation or joint decision-making over time and identify pathways to efficiently resolve conflicts or other challenges.

Governments can be closely involved in institutional-level CAM planning and implementation. The Higher Education Funding Council for Wales (HEFCW) helped fund the preparation of joint business plans for institutions that agreed to merge, and subsequently reviewed the plans to determine whether it would provide full grant support, while also providing feedback and advice (Benneworth and Zeeman, 2017). The Swedish government provided financial support for planning committees and working groups for the Växjö University-UC of Kalmar merger, and also appointed the "pre-rector" and "pre-board" for the resulting Linnaeus University (Bennetot Pruvot et al., 2015; Geschwind et al., 2016). The USG's Board of Regents developed guiding principles for merger planning and implementation and created consolidation committees for each proposed merger, including representatives from all participating institutions (Miller, 2017). Finland's Ministry of Education and Culture (Opetus- ja kulttuuriministeriö) set the agendas and appointed the planning groups for each merger (Nokkala and Välimaa, 2017). In Romania, the responsible Ministry approved a pre-contract establishing conditions, the parties' rights and obligations, and a timeline for completion of a merger, and also had to approve the final merger contract, based on the need for legislative approval (Andreescu et al., 2015). Finally, in the late 1980s, the Australian Government also adopted guidelines for institutional mergers (specifying that merged institutions should form one unified governing body, chief executive, educational profile, funding allocation, and set of academic awards), and its Task Force on Amalgamations evaluated the plans of institutions, and state and territorial governments (Harman, 2000, p. 363).

Another more flexible government role may be to assist in mediating CAM negotiations between institutions and other stakeholders. The Australian Government's Task Force on Amalgamations also played this role with respect to negotiations between institutions and state/territorial governments (Harman, 2000). The HEFCW was also a "broker" between institutions negotiating CAM in Wales, while a government advisor chaired the joint working group that helped negotiate the creation of the University of Manchester (Georghiou, 2015; Gummett, 2015). Institutions can hire mediators themselves, of course, and will often seek a more neutral party, but governments may encourage or help them to secure mediation even in these cases.

HEFCE (2012) argues that monitoring, evaluation and learning are also important. Many forms of CAM are conducive to ongoing monitoring and evaluation, but not one-time CAM such as mergers. Institutions have little incentive to evaluate merger processes because negative findings may undermine momentum among stakeholders, and those

involved are unlikely to have the occasion to act upon lessons learned. However, evaluations can help inform future CAM at other institutions and support accountability for public resources. The HEFCW required that institutions evaluate CAM using its support funds, and made those evaluations (including lessons learned and recommendations for future improvement) available online to other institutions and stakeholders (Benneworth and Zeeman, 2017). In New Zealand, the Ako Aotearoa Regional Hub Project Funds programme evaluation produced a guide for future inter-institutional collaborations that is also available online.[10] HEFCE (2012) also warns, however, that imposing rigid or onerous arrangements for monitoring and implementation could risk undermining effective implementation.

Where governments support the implementation of CAM, the literature affirms the importance of ensuring this funding actually meets institutional needs. Often the adequacy of funds is hotly debated, as in Flanders where the sector estimated funding accounted for just 10% of the costs of implementing "associations", although just 54% of the resources made available were spent (Bennetot Pruvot et al., 2015; Huisman and Mampaey, 2016). Institutional stakeholders may associate subsequent funding trends with mergers, so expanding financial resources can help generate momentum for integration (Skodvin, 2014).

5.3. Securing stakeholder buy-in

Successful CAM efforts call upon buy-in from internal and external stakeholders, all of whom may make or break initiatives through their political and economic influence, or by withholding their participation. The "micro-politics of collaboration" matter (Larivière et al., 2015).

5.3.1. Stakeholder engagement

Institutional stakeholders include leaders, faculty and staff, and students. The literature is clear that if institutional leaders are not at the forefront of planning and implementation, CAM initiatives have little chance of success. The practical importance of involving staff and students in CAM decision-making is less clear from the evidence, appearing to depend greatly on the context and intensity of the CAM.

Intensive CAM are complex change processes requiring careful co-ordination and communication. Even where governments acted aggressively to promote restructuring CAM, as in Denmark in 2006 and Australia in 1987, buy-in from institutional leaders was viewed as essential to the initiatives' success. In Wales, the government pursued a less intensive collaboration between two institutions after determining that their new vice-chancellors were not in favour, although in other cases it appears to have pushed for the replacement of vice-chancellors seen as obstacles to CAM (Benneworth and de Boer, 2016; Gummett, 2015). The only case where steering authorities seemed to impose mergers with little consultation of or support from campus leaders is in Georgia (US) (Miller, 2017).

A key challenge for policymakers is to empower leaders within their institutions. This partly explains why concentration measures often coincide with significant reforms of institutional governance and management. Where leaders are elected by the institutional community, CAM can become a key election issue. In Finland, for example, Arbo and Bull (2016) document leaders opposing or favouring mergers during elections, or pursuing CAM only once in their final term. In France, Musselin (2014) also notes that

the presidents leading the Strasbourg merger became particularly active following their successful elections, whereas Sursock (2015) reports that presidents in Lille lost their elections partly due to their engagement with discussions regarding CAM.

The literature reflects common scepticism or antagonism of faculty and students towards mergers in particular. This can relate to material interests, influence over institutional direction, or identity concerns.

CAM can have important financial implications for staff and students. Of course, CAM that seek to eliminate redundant services and programmes affect job security. More intensive mergers that unify payroll and other benefits structures can also change compensation arrangements, although institutions often harmonise compensation on more advantageous terms, for example such that merging institutions equalise salaries at the level of the more generous party. Mergers may lead to changes in student fees. Stakeholders are also sensitive to possible operations disruptions due to CAM and aligned changes, especially students given deferred employment earnings are the greatest cost of attending higher education in many jurisdictions.

Staff and students will consider how CAM may alter power structures within institutions and academic units (Stein and Short, 2001). They may view larger agglomerations as less responsive to their interests, and some "evidence suggests that faculty of a smaller institution absorbed in a larger institution find their new environment less congenial and less satisfying" (in Evans, 2015). These stakeholders may also have ideological views regarding government and private sector influences.

Many concerns relate closely to institutional identity. Researchers have argued that "in all mergers there is a sense of loss of institutional identity" and that "a degree of staff alienation is probably inevitable in every merger" (in Evans, 2015). Skodvin (1999) suggests these concerns can affect academic planning for up to ten years, but other research might suggest even longer.

Employee reactions to CAM initiatives are not uniform however. As Evans notes, "in most cases, academics still identify more strongly with their discipline rather than with their university as a whole. Thus, it is not surprising that anxiety and resistance in [mergers] often tends to be stronger among central support staff than among academic staff" (in Evans, 2015). CAM often also more directly affects administrative staff, as they typically have less job security and are targets to reduce overhead. In Georgia (US) for example, mergers eliminated positions in administration but did not affect the academic workforce's job security (Miller, 2017).

Analysts often further argue that when pursuing broader structural reforms, policymakers should consult and engage staff and students extensively in decision-making where possible, indicating CAM processes involving more "bottom-up" input are more likely to succeed, including in creating a new staff identity (Boudard and Westerheijden, 2017; Nokkala and Välimaa, 2017; Skodvin, 2014). Another related argument is that negotiations should be transparent, notwithstanding governments' frequent preferences for confidentiality (Harman and Harman, 2003).

Yet, while many would expect that failing to engage and inform stakeholders in policy development would alienate them, experiences provide a more nuanced picture. Examples abound where government and institutional leaders have driven transformative processes with relatively little consultation, including in brief policy profile cases of Australia, Finland, Flanders, and France. Justifications for limited engagement have included tight timelines and an assumption that stakeholders will oppose CAM initiatives

regardless (Gummett, 2015; Nokkala and Välimaa, 2017). Many of these less consultative processes were broadly successful, and Harman (2000) notes significant ex post stakeholder acceptance of Australia's mergers, including among groups such as faculty whose representatives had often been initially opposed or at least more sceptical. Government policies and communications may help by proactively addressing many stakeholder concerns, such as protecting job security and working conditions, or legally enshrining stakeholders' position in governance, as in French and Welsh policy profile experiences (Harman and Harman, 2003).

Institutional staff may also be interested in initiating collaborations themselves, typically less intensive ones. Governments have a long history of funding narrow collaborations initiated by individual faculty members, for example through research funding. Faculty, staff and even students may initiate collaboration proposals for some government innovation funds, often exercising leadership within institutional departments. This may be a product of explicit policy design, as in the case of the HEFCE Catalyst Fund, or result from how institutions organise themselves to respond to funding programmes (HEFCE, 2017). In some cases, institutions may also establish innovation-style funds internally to support collaboration ideas instigated by staff and students, perhaps within the context of a larger consortium or collaboration. For example, St. Olaf College and Carleton College in Minnesota have provided USD 200 000 in grants to support 32 collaboration projects between the two institutions initiated by 200 faculty and staff and 500 students (Askin and Shea, 2016). Collaborations have included shared technology and library services under the direction of shared staff, but the extent of activities in core areas of instruction, research and service is unclear.

Staff may also face important administrative barriers to pursuing collaboration, even when this is a high-level institutional priority. Administrative barriers may include internal processes of approval, setting fees, resource allocation, and QA, as well as career progression incentives (Stein and Short, 2001). Often collaborating institutions need to align these policies. Governments can sometimes work with institutions to address these challenges.

5.3.2. Communication

Because successful CAM initiatives require persuasion, analysts typically advise governments to design communication strategies as carefully as fiscal, regulatory and legislative instruments. In fact, communication goals can inform the design of these other instruments.

In major structural initiatives, major advisory reviews attract considerable attention and legitimacy. A single or even multiple white papers or their equivalent announced major concentration measures for example in Australia (1987), Denmark, Finland, Ireland, Norway and Wales. These may be undertaken by prominent local or international experts, including OECD review teams (as in the cases of concentration initiatives in Denmark and Finland). In some cases, governments may accept the spirit of the report while rejecting the specifics.

The literature strongly suggests that communications should emphasise academic objectives foremost, ahead of efficiency and cost concerns (Bennetot Pruvot et al., 2015; HEFCE, 2012; Parthenon-EY Education Practice, 2016). This is consistent with institutions' missions and a practical means to ensure buy-in from internal stakeholders. HEFCE (2012, p. 5) argues, "pragmatism is insufficient" and "successful CAM projects have a strong academic purpose that is underpinned by a sound economic rationale". This

advice may often speak to making a positive case for the CAM opportunity more than a negative case regarding financial threats from the status quo. For mergers, experience suggests emphasising potential for scale to benefit the academic mission. HEFCE (2012, p. 5) further argues that proponents of CAM should "recognise the power of a simple, forward-looking idea" aligned with a strategic narrative and vision for the medium to long-term, recognising that CAM goals cannot be achieved overnight.

Institutional leaders, again, are usually best positioned to bring internal stakeholders onside, but also often have credibility with external stakeholders, so analysts consider that effective communication during CAM processes requires their close involvement. Mechanisms to keep staff and students updated on the execution of CAM and opportunities for them to benefit appear very important.

Often communication discipline and alignment may be required of institutional leaders. However, Australian experience has shown that it is possible for institutional leaders to implement CAM effectively even while decrying the policy impetus (Harman, 2000). This experience reflects the challenges of navigating contradictory pressures from internal stakeholders.

Even if effective implementation implies limiting disruption of productive activities, HEFCE (2012) argues that where CAM are geared towards drastically changing work processes they should be communicated as constructive disruptions of the status quo. Stakeholders typically assume mergers are transformational, but HEFCE recommends taking "unmistakable steps" to demonstrate something new is being created with less intensive CAM (p. 29). Often, governments and institutions co-ordinate capital investments to provide physical manifestations to CAM and deliver immediate benefits for stakeholders, even though these projects might have been independently desirable and even achievable.

Communication strategies can shape the institutional form that CAM adopt, so analysts indicate that government and institutions should be careful that in advocating for CAM they do not lock-in structures that greatly undermine its benefits. One especially important risk can be presenting unequal CAM as being "of equals", where in fact one party should predominate for practical reasons. HEFCE (2012) argues that it is better to be honest about the relative size of the parties engaged than create unrealistic expectations and ill-adapted decision-making structures.

5.4. Concentrating resources

Many policies to implement CAM require strategic targeting of resources towards specific institutions. In many case this has accompanied a broader shift in strategy from equitable treatment of all the system's institutions towards differentiation and emphasising certain institutions as elite. Implementing these kinds of policies can be very difficult.

While excellence funding schemes aim to promote world-class institutions, they also recognise that some institutions cannot achieve this status. Schemes have often ended up including more institutions than initially intended, largely to avoid political rebukes from excluded institutions and their regions. The Spanish Campus of International Excellence programme is emblematic of this pattern, but it was also present in French, German and South Korean programmes (Shin, 2009). Finland also extended to others certain benefits originally offered to Aalto University.

The political feasibility of resource-concentrating policies depends on the cultural, economic and social context, although governments may facilitate their use through compensatory policies, communications or other measures. In terms of a compensatory policy, the Australian Government's NCRIS concentrates research infrastructure within certain institutions, but requires that these institutions permit access by other actors across the system. In terms of communication, the literature suggests that the development of a strategic narrative is essential. In Finland and France, the narrative was of improving national competitiveness and supported by excellence funding schemes.

Another related issue is the post-merger concentration of activities on particular campuses, to the point of campus closures in Finland and Wales (Vartiainen, 2017; Zeeman and Benneworth, 2017). This concentration may be essential to accomplish the efficiency and academic goals of mergers. As well, many branch campuses may be simply unviable on their own or within a merged entity, barring government subsidies that would not pass a cost-benefit test. Still, such measures are often controversial especially where they significantly affect whole communities, as is often the case in smaller, more isolated and more economically disadvantaged rural places. Such fears can also prevent mergers from occurring, as in the case of Glyndwr University in Wales (Benneworth and Zeeman, 2017).

5.5. Policy alignment

Finally, in strategies to promote inter-institutional CAM, alignment of policies appears crucial, including proper sequencing. The policy profiles identify numerous cases of significant concurrent reforms that complemented or detracted from CAM initiatives. If framework policies, direct measures and concurrent reforms are contradictory, or if institutional leaders are over-burdened with responding to multiple initiatives, institutions are unlikely to pursue CAM as extensively or successfully as intended.

In most circumstances, a key strategic policy goal is to provide a stable, predictable environment in which institutions can pursue CAM because uncertainty about the evolution of the policy framework can undermine incentives and planning (Boggs and Trick, 2009). Among the policy profile jurisdictions, France may be especially noteworthy in the consistency of its national approach.

Nevertheless, higher education system restructuring has often taken place in the context of unpredictable broader societal and economic transformations that may directly affect institutions, but certainly shape the political dynamics surrounding and ultimately within them. This was most obvious when Hungary and South Africa pursued consolidation as they emerged respectively from communism and Apartheid in the 1990s (Goedegebuure, 2012). Less drastic but nevertheless transformative changes in public-sector governance accompanied merger waves in Australia, Denmark, Norway and Wales. There can be communication advantages and drawbacks to implementing CAM policies in concert with broader systemic changes, depending not only on the extent to which the concurrent policy change is controversial, but also whether it distracts from or the CAM initiative or gives it controversial symbolism. Australia's 1981 merger policy was likely more controversial because of its positioning as part of a broader transformation of the role of the Australian Government (Harman, 2000). Governments and institutions may also learn from experiences in other sectors. For example, Denmark modelled its concentration of universities and research institutes on similar policy initiatives affecting local governments (Aagaard, Hansen, Rasmussen, et al., 2016).

Specifically in Europe, the adoption of Bologna degree structures coincided with many major CAM initiatives. Studies cited concurrent Bologna implementation as a key complication that undermined Spain's Campuses of International Excellence Programme (Seeber, 2016). In contrast, the Bologna Process had broad support in Flanders and among stakeholders clearly justified the establishment of *association*s between universities and UCs, notwithstanding *associations'* broader implications (Huisman and Mampaey, 2016). These cases illustrate also how concurrent reforms' smooth implementation may be essential for the success of CAM initiatives.

Institutions often respond to CAM initiatives when they are tied to an opportunity for upgrading physical infrastructure. This is perhaps most apparent in the alignment between France's concentration efforts and excellence funding initiatives. Another institutional case is that of the merging University of Manchester, which invested £250 million in its estate (HEFCE, 2012).

Offers of greater institutional autonomy are another common carrot for institutions to pursue CAM, but concurrent governance reforms can increase institutional workloads and undermine implementation. When French reforms permitted institutions to apply for greater autonomy, differences in institutional preparation and willingness to take this opportunity on became a key challenge for collaboration within PRES (Sursock, 2015). In Finland, the 2009 Universities Act may have facilitated concentration by distracting opposition, it compounded the reforms for institutions to manage (Nokkala et al., 2016; Nokkala and Välimaa, 2017). With respect to UASs, the Finnish Government appears to be implementing governance reforms fully in advance of further concentration measures to avoid this pitfall.

Co-ordination with sub-national governments can also be important for CAM initiatives. This is apparent in the profiles of Australia, England, France, the Netherlands, Spain and Sweden.

The most important step of all for ensuring policy alignment is likely positioning CAM initiatives within a broader system vision. This is part of why governments often complete system strategies or reviews in advance of CAM initiatives. CAM can have implications for institutions' core mandates, especially where they involve different types of institutions such as universities and polytechnics. If collaboration is about pursuing goals institutions cannot accomplish on their own, it appears crucial for governments to identify those goals and how they can be achieved before pursuing CAM initiatives.

6. Conclusion

The literature on institutional collaboration in higher education remains limited. Much has been written about mergers of universities in recent years, comparatively less on collaborations and alliances or regarding mergers of other higher education institutions. Significant work has examined the patterns and impacts of faculty collaborations in research, much less on faculty collaboration in instruction. Perhaps most importantly, researchers have yet to provide a clear picture of the impacts of collaboration and consolidation initiatives on the core higher education activities of instruction, research and engagement. Many evaluations focus on individual initiatives or institutions, fewer study experiences across higher education systems, and still fewer use empirical methods. Of course, limited knowledge of impacts may speak as much to the vast diversity of arrangements that fall under the CAM rubric as to the limitations of current studies.

What the literature does demonstrate is that promoting CAM in higher education is complex and can become highly contentious, especially when used as a means of achieving inherently difficult policy goals, such as consolidating capacity. Initiatives' prospects of success are contingent on their particular context and the quality of their design and implementation.

The literature also outlines the strategies government and institutional proponents of CAM have pursued in the past. Government policies create framework conditions in which institutions choose when and where to collaborate or to compete, such that governments can in fact be in the way of collaboration in some cases, whether deliberately or not. Governments also can use a host of legal, regulatory, financial, informational and political instruments to provide a direct impetus for institutions to engage in CAM and shape the ways they do so. For governments to be effective in initiatives to promote CAM, key challenges are to achieve policy alignment, stimulate institutional initiative, secure stakeholder buy-in, support planning and implementation, and concentrate resources.

Institutional collaboration and consolidation initiatives can allow governments to achieve important policy aims. The findings of this paper can help governments to assess the potential benefits and costs of initiatives, identify the range of policy tools at their disposal, and adopt strategic approaches to attain the greatest possibility of success.

[1] In the English Association of Colleges' equivalent to the CAM spectrum they actually place federations between collaborations and mergers in place of alliances, although their definition has some overlap with the definition of collaborations here.

[2] Fully 99 out of 134 UK higher education institutions were involved in offshore education.

[3] Unbundling could actually apply to different higher education activities beyond only these dimensions of instruction, including areas of student services such as housing or career advising.

[4] The study countries are Flanders (Belgium), France, Ireland, the Netherlands, Norway, Portugal Spain, Sweden, and the United Kingdom.

[5] The figure was provided as over CAD 39 million, and converted to USD based on the exchange rate on January 1, 2016.

[6] Russell (2017) finds similar increases in tuition where merging institutions previously charged different fees as compared to where they charged similar fees. This implies that fee increases do not result only from harmonisation at the more expensive institution's fee level.

[7] Exceptional cases of mergers that were not policy induced include the merger of the University of Lisbon and the Technical University of Lisbon in 2012-13, where the institutions had to persuade the government to grant them permission to merge. A case of a system restructuring merger that was basically institutionally initiated was the creation of the University of Catalonia (Bennetot Pruvot et al., 2015; Goedegebuure, 2012).

[8] As of 2013, only one fully competency based programme had been approved by a regional accrediting organisation in the United States (Leblanc, 2013)

[9] This finding was supported in a survey of 18 universities from Austria, Cyprus, Denmark, Finland, France, Greece, Ireland, Israel, Italy, the Netherlands, Portugal, Slovenia, Spain, Switzerland and the United Kingdom. (Carey and Trick, 2013; Henderikx and Ubachs, 2017).

[10] "Getting on: A Guide to Good Practice in Inter-Institutional Collaborative Projects" is available at: https://akoaotearoa.ac.nz/ako-hub/ako-aotearoa-northern-hub/resources/pages/critical-success-factors-inter-institutional-project-collaborations

Annex A. Policy profiles of collaboration and consolidation initiatives

This annex presents brief profiles of policy initiatives to promote CAM in various higher education systems, mostly over the past two decades, which directly inform the analysis for the main report. Most profiles focus on major system restructuring initiatives, including concentration processes and excellence funding initiatives.

Australia

This policy profile considers two separate areas of initiatives to promote CAM in Australia: firstly, major concentration programmes to consolidate Australia's higher education institutions; and secondly, initiatives to research collaboration, especially in infrastructure.

Three waves break the binary barrier

Harman identifies three merger waves in Australian higher education since 1960 that gradually developed larger and more comprehensive institutions, and culminated in the abolition of the binary division in the early 1990s (Harman, 2000).

The first merger wave, from 1960-1981, combined specialist Colleges of Advanced Education (CAEs), many of which operated in close geographic proximity. Institutions largely drove the consolidation, largely without federal co-ordination by the (federal or Commonwealth) Australian Government, although state governments played an important role in some cases and a few mergers were forced on institutions. Key environmental drivers as of the late 1970s included falling enrolments, declining budgets, and an oversupply of school teachers. Institutions merged to confirm their status as CAEs and thereby gain access to federal funding, while some also sought to update their credentials and award bachelor's degrees.

Even though public higher education still fell formally under the jurisdiction of states and territories, by the time of the second merger wave, from 1981-1987, the Australian Government had become fully responsible for funding. It drove restructuring in the context of broader efforts to reduce overall its spending and responsibilities, announcing in 1981 that 30 teacher education CAEs would lose funding if they did not merge with more comprehensive CAEs or universities. Despite significant controversy and conflicts not only with institutions but also state and territorial governments, 39 institutions merged into 13 and only four identified institutions failed to implement mergers. Many

participating institutions publicly protested the government's policy but merged as asked, while many had already planned to merge.

The Australian Government again drove the third merger wave, which proved to be the most transformative, in the context of a comprehensive reform of higher education. In December, 1987, a Green Paper on reform recommended substantial changes, and after comment a White Paper laid out more specific reform plans. The new policy approach would create a Unified National System to "develop in a more systematic way a higher education system with fewer institutions, each having a broad and more diverse educational profile, thus providing a sounder basis on which to operate in a more competitive environment in which funding will be allocated increasingly on the basis of performance" (Harman, 2000, p. 353). Key dimensions of the reform were: abolition of the binary; institutional consolidation through mergers; increasing enrolment; more selective research funding; changes to the composition of governing bodies; increased authority for vice-chancellors; changes to increase institutional efficiency; and raising the share of higher education funding from households and the private sector.

The Australian Government committed not to force mergers, but indicated institutions that did not merge risked financial penalties. The new Unified National System established new requirements for institutions to receive public funding, most importantly enrolment requirements of: 2 000 equivalent full-time student units (EFTSU) for basic activities; 5 000 EFTSU for a broad teaching profile and specialised research activity; and 8 000 EFTSU for comprehensive involvement in teaching and research. Only 13 institutions met the comprehensive threshold and 26 did not meet the basic threshold.

The Australian Government also offered generous treatment to merging institutions as it expanded the number of student spaces that it funded across the system, introduced almost AUS240 million in capital funding in 1990 and 1991, and relaxed restrictions on international recruitment (Harman, 2000).[1] In 1989 and 1990, the Australian Government also provided AUS21 million in grants to finance merger costs, and loans to address redundancies and early retirements.

The Australian Government used other mechanisms to steer the merger process. To prevent inter-campus conflict and duplication and ensure efficiencies, it adopted guidelines indicating that merged institutions should have one unified governing body, chief executive, educational profile, funding allocation, and set of academic awards ("almost all" the multi-campus institutions that emerged did adopt unitary structures) (Harman, 2000, p. 363). The Minister also appointed a Task Force on Amalgamations to facilitate negotiations among institutions and state/territorial governments and to advise on which merger plans were satisfactory. The Task Force produced a final report that recommended the allocation of capital and amalgamation support funds.

Institutional leaders voiced some public opposition but acted aggressively. Ultimately, 56 of Australia's 74 institutions participated in mergers between 1987 and 1991. Some had begun their merger processes prior to 1987, in part to get ahead of government decrees, while many institutions that did not pursue mergers had been active in the previous wave. Many mergers involved the absorption of CAEs, in fact universities engaged in bidding wars for CAE partners, including institutions that were above 8 000 EFTSU and some of Australia's most prestigious research universities such as Monash University and the University of Sydney. Many state and territorial agencies introduced ambitious plans, although some more quickly than others.

Harman's overall assessment was that mergers across the three waves were broadly successful. In the first wave, the mergers appeared to achieve significant efficiency gains, to facilitate strategic investment in capital infrastructure, to strengthen academic programmes and to expand student services. An evaluation of the late 1970s mergers found that they strengthened institutions in terms of programmes, staff qualifications, infrastructure, and student and staff satisfaction (in Harman, 2000). The mergers had achieved some savings, but less than might have been hoped due to continuity of considerable employment.

In the second wave, the consolidated CAEs seemed to make important efficiency gains, as well as academic gains in terms of enrolment in degree and post-graduate courses. Key challenges included limited government funding to support merger implementation (in fact the government reduced funding in this time period) and difficulties accomplishing mergers of CAEs with universities across the binary divide, which meant many institutions remained small and maintained duplicate courses relative to neighbouring institutions.

The institutions created through the third wave were more comprehensive and offered wider ranges of disciplines and programmes, including at the graduate level. More CAE staff gained the opportunity to undertake research. The reform achieved widespread stakeholder support, despite some criticism particularly among academic staff, and later surveys found widespread support for further mergers a few years after the process was complete (in Harman, 2000).

Harman notes that no mergers from the first wave were reversed, most of the second wave mergers were stable and few of the third wave mergers were subsequently undone. Where there were difficulties following the third wave, most related to federated structures and conflicts between campuses. The mergers did cause a loss of institutional diversity. The third wave in particular created a new three-tiered hierarchy of old universities, technological universities, and new universities formed by previous CAEs, all pursuing the same prestige profile (Skodvin, 1999). The mergers also spread research funding across a wider set of institutions.

Research funding initiatives

Australia has recently implemented a pair of prominent research funding programmes focused on facilitating institutional collaboration: the National Collaborative Research Infrastructure Strategy (NCRIS) and the Collaborative Research Networks (CRN) programme.

The Australian Government has invested more than AUD 2.8 billion (Australian Dollars) in the development of infrastructure under the NCRIS since 2004, while stimulating more than AUD 1 billion in co-investments from state and territorial governments, institutions, research facilities and the private sector (Department of Education and Training, Australian Government, 2017). Presently the programme is supporting 27 projects involving 222 institutions. More than 35 000 researchers use NCRIS facilities.

NCRIS funding has focused on areas where Australian research has the potential to be world-class and connected with the principle that "single institutions on their own cannot achieve the levels of research infrastructure needed to support [world-class] research" (NCRIS Evaluation Team, 2010). This approach also sought to provide a more strategic framework for funding and thereby better orient infrastructure towards national needs, while breaking down the silos that more competitive funding seemed to foster. The

overall goal was not only to avoid duplication in construction of infrastructure, but to optimise use. To receive infrastructure support, institutions were required to implement open access regimes for researchers across the country.

NCRIS also supported platforms for collaboration to backstop research agendas in priority areas. Key components have included the National Computational Infrastructure (to support high-performance computing capability), the Interoperation and Collaboration Infrastructure, the Australian National Data Service (supporting researchers to identify, locate, access and analyse available research data), the Australian eResearch Infrastructure Council (governing and co-ordinating the platforms for co-operation) and the National eResearch Architecture Taskforce.

The Integrated Marine Observing System (IMOS) is an example of a NCRIS-supported collaboration, taking the form of a foundation and led by the University of Tasmania but involving a host of other universities, institutes and government agencies (Department of Education and Training, Australian Government, 2015). IMOS programmes include the ARGO Australia contribution to a "global network of free-drifting profiling floats that measure the temperature and salinity of the upper 200 metres of the ocean", and deep-water moorings in "globally significant regions" to track changes in ocean currents.

The NCRIS Evaluation Team Report of 2010 found the programme was appropriate, cost-effective and "substantially improved the allocation of resources". Collaborations helped improve resource allocation and broaden perspectives though financing infrastructure access remained a persistent challenge.

The CRN programme aimed to expand capacity for research among smaller and regional universities and to provide researcher training, by providing funding for these institutions to pursue collaborations with external partners. Between 2009/10 and 2016, the Australian Government provided AUD 81.1 million in support for 15 projects over two selection rounds (ACIL Allen Consulting, 2015). Funding was flexible in how it could be spent and the types of activities it could support, which included programmes focused on specific fields and aiming to develop indigenous research. The CRN mid-term evaluation found that the programme had generally been able to demonstrate value for money, although programmes may not have been as self-sustaining as originally hoped. CRN support increased institutions' number of graduate research students, research grant applications, and successful research grants, with only the value of the grants obtained falling below the programme's original target (while still rising 85% over baseline). The programme also drove greater strategic focus in research, spurred institutional reforms and created new linkages. The evaluation identified a number of recommendations for further improving the programme that could be relevant to other jurisdictions.

Denmark: Concentrating universities and government research institutes

Denmark's 2001 Research Commission placed mergers of universities and research institutes firmly on the policy agenda (Aagaard, Hansen, Rasmussen, et al., 2016). The

2001 Commission also recommended a review of Denmark's universities and then, in 2004, an OECD review recommended that single-faculty universities merge with more comprehensive partners. Universities represented approximately 49% of enrolment in higher education.

In response to the 2001 Commission, the Danish Research Council reviewed the Government Research Institutes (GRIs) to recommend whether each should continue maintain its status, merge with another GRI or university, or close. An inter-ministerial working group also began formulating general guidelines and proposed the establishment of a committee to identify joint principles for collaboration between GRIs and universities. The first GRI mergers took place in 2004; two with the Royal Veterinary and Agricultural University, one with the University of Copenhagen and one with Aarhus University. GRIs fell under different ministries, which in many cases were not in favour of mergers, but whereas the Ministry of Science was a key proponent of mergers and felt it should lead the way two of its GRIs were among the first to merge.

Denmark's active concentration strategy began in 2006, one year after the full implementation of reforms creating more managerial university governance structures (Aagaard, Hansen, Rasmussen, et al., 2016). The government modelled this concentration process off a recent local government reform. It primarily used edict powers, but also indicated that institutions that went along with the merger process would be better positioned to benefit from substantial growth in research funding envisioned within the rubric of its Globalisation Strategy (Aagaard, Hansen and Rasmussen, 2016). As well, in advance of the full process two proposals for mergers envisioned the creation of new institutions that would carve out parts of current institutions, presenting a threat that encouraged those institutions to be proactive in shaping concentration to meet their needs.

The Ministry indicated that the government was driving the process, but would consider all institutional input. It requested that over (merely) two months all universities "engage in a dialogue with all potential partners in advance of a process towards integration", and all GRIs to prepare expressions of interest for integration with universities and other GRIs (Aagaard, Hansen, Rasmussen, et al., 2016, p. 81). These outputs resembled brainstorming sessions, but illuminated institutions' preferences. While there was considerable scepticism or outright opposition to mergers among five GRIs and four universities, eight universities and eight GRIs were mostly positive. Comprehensive universities expressed particular interest in single-faculty partners, some of which opposed mergers however.

The Ministry's next step was to propose an outline (map) of a new system that left only one university unchanged and four universities and four GRIs for further discussion. The overall strategy was to provide gains to every regional university. Bilateral meetings with institutions followed, but the proposals were basically edicts, leaving institutional boards to work out implementation planning. With the institutions and GRIs whose status remained unresolved, the Ministry continued with direct negotiations on a tight deadline. Only one university's status took a few more months to resolve prior to its absorption.

In the end, Denmark consolidated its universities and GRIs from 12 and 13 respectively to eight and two by 2007, including mergers underway but not yet complete. The Ministry allowed two single-faculty universities to remain independent, as well as two GRIs although these had to rename. The government created a National Food Forum to co-ordinate institutions' work in this area, appeasing supporters of the earlier idea of a university focused on food-industry studies. Many of the mergers were relatively loose. Institutions did not immediately physically relocate or break up, though some did so in

subsequent years. Implementation has been marked by important institutional conflicts that have undermined integration in many cases.

England (United Kingdom): Funding collaboration and innovation

HEFCE (2012) indicates there is "no question of a top-down approach" to promoting CAM in England. The government has been supportive of institutionally-initiated CAM however, largely through funding from HEFCE, as well as regional development agencies, local governments and the European Union.

England's best-known merger sought to create a world-leading university for the Northwest. The University of Manchester is often cited as a textbook institutionally-initiated merger, but the government provided GBP 80 million to support the process and invested heavily in the new institution's physical infrastructure (Bennetot Pruvot et al., 2015; Goedegebuure, 2012). The merger received most of the HEFCE Strategic Development Fund (SDF) moneys available at the time, and support from the Northwest Development Agency and scientific funds (Georghiou, 2015). The institutions' history of collaboration, including joint facilities, and the two vice-chancellors' shared intention to retire made the merger easier.

Development agencies, local governments and HEFCE supported three English CAM to expand regional higher education coverage. The most intensive was the merger to create the University of Cumbria (although agencies subsequently withdrew some funds due to fiscal impacts of the economic downturn), which was also spurred by a government commissioned report. The Combined Universities in Cornwall (an unincorporated partnership of five local higher education and FE institutions) and University Campus Suffolk (a collaboration between the Universities of East Anglia and Essex) received similar support.

The English Government also provided GBP 2.3 million to support two institutions intensifying their strategic alliance by merging to create the University College for the Creative Arts (HEFCE, 2012). The merger was largely an institutional response to a new 4 000 full-time-equivalent enrolment requirement that brought university status within reach.

HEFCE has re-titled its SDF as the catalyst fund (Johnes, 2016). It is an innovation fund that provides up to GBP 30 million in annual funding (in packages in the thousands or millions of GBP) for projects that "will normally be collaborative, bringing together support from other partners including businesses, universities and colleges, and other public agencies" in pursuit of a range of policy objectives (HEFCE, 2017). Collaborations have included: a Leeds partnership for med-technologies innovation; alliances of universities in the North of England; and a collaboration of music colleges, a museum and Google to expand access to cultural content.

Finland

System consolidation

From the 1950s to the 1970s, the number of Finnish higher education institutions grew consistently with a guiding view was that distribution of institutions across the national territory would improve labour force qualifications and development. Expansion continued in the 1990s as the amalgamation of many upper vocational institutions created polytechnics, now referred to as UAS. Universities also opened satellite campuses in towns without a university of their own, called "university centres" (Nokkala and Välimaa, 2017).

However, in the 1990s Finland's policy goals began to gradually shift from equal treatment of institutions towards a more differentiated approach. The policy judgement was that larger institutions could be stronger, more efficient, more able to effectively exercise institutional autonomy, and as a result more internationally competitive, encapsulated in the concept of the "world-class university". A series of reports around 2000, underlined this shift in view, especially the 2004 Brunila Report that criticised Finland's scattering of smaller institutions.

The creation of six "university consortia" on a regional basis, starting in the early 2000s, was a key early step towards consolidations (Vartiainen, 2017). Consortia offered collaborative bachelor's and master's study programmes mainly for adult learning and were primarily funded through EU structural funds and local municipalities, in addition to the national government. One consortium offering a joint programme in business studies led directly to the merger of the Universities of Joensuu and Kuopio, when the third institutional partner withdrew and the National Ministry indicated it would only permit that the other two institutions offer business degrees if they merged.

In 2006, the Ministry of Education issued a discussion paper on structural development of the higher education system. The paper proposed to differentiate institutions' profiles and concentrate resources in fewer, larger and stronger institutions. For the regions, the paper envisioned closer collaboration between universities and UAS to meet local needs, whereas larger cities would aim to become global centres for science and technology. The government did not openly consider any alternative approaches to restructuring. It established in 2007 a strategic goal to "increas[e] 'world-class' expertise and creat[e] 'higher education entities that are regionally stronger and more effective in terms of knowledge' " (in Nokkala et al., 2016). Operational goals included concentrating resources in fewer stronger units (down from 20 universities in 2007 to 15 by 2020), reducing overlaps in educational and scientific activities to create strong university profiles, ensuring universities operate in multiple fields, and achieving greater collaboration between universities and polytechnics while maintaining the binary division. The Ministry asked universities to provide suggestions for structural development, with these proposals to form the basis of 2007 performance agreement negotiations.

To encourage and support mergers, the government used multiple mechanisms aligned through performance agreements and an annual target process. Instead of setting strict deadlines it provided funding to support mergers only between 2007 and 2010. Merging institutions received EUR 12-14 million while an alliance that ultimate broke down

received EUR 6.1 million (Nokkala et al., 2016). Some additional funding policies related to the government's excellence initiative, discussed in the next subsection. The government also established an expectation that each university would have at least 3000 full-time students (a target that six universities and four arts schools did not meet), and that departments would have at least 5-10 professors (Nokkala and Välimaa, 2017). Finally, government decrees granting institutions the right and responsibility to award degrees in their fields of interest was another important tool, as with the Universities of Joensuu and Kuopio.

Once merger agreements were reached, the Ministry appointed the planning groups for each process, which included prominent societal figures such as external experts (domestic and foreign), regional government representatives, and industry leaders. The Ministry exercised considerable control over these nominations and the committees' agendas under this structure.

By 2013, Finland reduced its number of universities from 20 to 14. Some universities have achieved significantly reduced costs, including through rounds of layoffs. Institutions have also reorganised internal structures, decision-making systems and management. The system consolidation took place in the context of significant governance reforms, as the 2009 Universities Act restructured institutional governance and funding, granted universities more autonomy as independent legal entities, but also required universities to engage more with society and be more internationally competitive. Parallel implementation of these extensive reforms was a major challenge for some merger processes.

Rectors of merging institutions generally bought in strongly (Nokkala et al., 2016). However decision-making processes largely excluded students and staff as presumably critical, at least until mergers were well under way, although institutional-level planning groups consulted students and staff in at least one case (Nokkala and Välimaa, 2017; Tienari et al., 2016). Nevertheless, there was little opposition to mergers, partly because much more public debate focused on the implications of the Universities Act. The greatest resistance was against Aalto University among students of the University of Arts and Design, but this faded once the final decision to merge was made. Some modest controversy also attended campus closures following three mergers (out of five branch campuses created) from 2009-16 as institutions focused on urban centres. The closure of branch campuses in core areas with other higher education options was less controversial than in more isolated communities (Vartiainen, 2017).

Consolidation of UAS and GRIs has not proceeded as rapidly. Some polytechnics have been merging, while others have engaged in closer collaboration, including in delivering joint services and pursuing internationalisation. In 2014, an Act of Parliament for UAS followed on the model of the 2009 Universities Act, including by allowing UAS to become independent legal entities independent from local governments and leading to a new licensing scheme with a greater emphasis on quality and impact. Consolidation of polytechnics is expected to accelerate moving forward, including reducing fragmentation across campuses within single institutions. Finland also began merging government research institutes with higher education institutions in 2015, and should be reinforced through 2017-2020 performance agreements. The Strategic Research Council has also promoted greater collaborations between these bodies.

A 2015 Ministry report found that further university mergers would be appropriate, as well as the abolition of weaker programmes or those outside areas of institutional profile. Funds to support restructuring have been earmarked. A key focus is on reducing the

regionalism of universities. Prominent leaders in Finnish higher education, including a dean of the University of Helsinki and the rector of Aalto University, have suggested halving the number of academic units in universities and the University Rectors' Council has prepared a proposal for merging units, closing programmes, merging fields of education and research, and redistributing resources among units, as an opportunity for universities to be in the driving seat for structural reforms (Aarrevaara and Dobson, 2016). The Ministry has previously reached an agreement for Universities Finland to co-ordinate bottom-up projects to reduce duplication in areas of significant programme overlap. Cross-binary collaboration has been less prevalent than intended, while the acts regulating UAS and universities do not allow cross-binary mergers. These rules may soon be relaxed.

Aalto University

The Aalto University merger combined concentration and excellence initiative (Bennetot Pruvot and Estermann, 2014). The government provided extensive financial and other support to help develop a flagship "innovation university" that would be a world leader in research and teaching (with a special interdisciplinary emphasis), strengthen innovation and boost economic competitiveness (Tienari et al., 2016).

Institutional leaders played a key role in driving the merger process. It appears that one of the institutions' rectors first proposed the merger idea in 2005, and all three were eventually in favour. The "innovation university" message allowed the merger to receive wide support from the business community, and also proved very successful in national and international media. The government's major 2006/07 study on system restructuring ultimately reinforced the Aalto merger's rationale the and even provided detailed instructions for implementation.

The government granted final approval for the merger in 2007 and provided extensive financial support. It made much more funding available to support costs associated with the Aalto merger than provided to other merging institutions (up to EUR 100 million until the end of 2015) (Bennetot Pruvot et al., 2015) However, the government's policy approach represents an excellence initiative especially because it committed to provide EUR 500 million to support Aalto's endowment capital conditional on Aalto securing EUR 200 million from private companies, and it introduced tax incentives specifically to encourage these private sector donations. Eventually political pressure forced the government to extend to the other universities these endowment benefits (Nokkala and Välimaa, 2017).

The merger was accompanied by ground-breaking institutional reforms. In particular, the university obtained legal status as a private foundation independent from the government, and established a US-inspired tenure system to help attract international faculty (Tienari et al., 2016).

Flanders: "Associations" of universities and university colleges

Flanders' higher education system includes university colleges (UCs, referred to as *hogescholen*) and traditional universities (Huisman and Mampaey, 2016). The former focused mainly on vocational education and training, and provided regional coverage to support access, while research was concentrated in the latter. From the early 1990s, the government introduced a minimum enrolment target for UCs of 2000 students (by decree), as well as financial incentives for mergers (Bennetot Pruvot et al., 2015; Goedegebuure, 2012; Huisman and Mampaey, 2017). System consolidation aimed to create institutions with more professional management, capable of exercising greater autonomy, and to adjust to regional declines in student numbers. Flanders' complement of institutions fell from 160 to 20 in ten years (Huisman and Mampaey, 2017).

As of 2000, both UCs and universities offered 2+2 programmes starting in the first cycle, which were called "degree programmes at an academic level" at UCs, and "academic degree programmes" at universities, while the UCs also offered three-year first-cycle programmes (Huisman and Mampaey, 2017). This structure appeared difficult or impossible to reconcile with the degree structures agreed to in the Bologna Declaration (1999), and was also seen as making the binary distinction unclear or even creating ternary divisions between the three degree types.

To address this challenge, a 2003 decree required that all UCs develop *associations* with a traditional university, with primary goal of bringing Flanders into alignment with the Bologna structure by transforming UCs' two-cycle programmes into full master's programmes with "academic equivalence" and the same quality as at universities. This process of *academisation* would be accomplished by better connecting these UC programmes with research activities based largely at universities, to support the development of research competencies among students. Additional goals of the associations included improving the efficiency of programme offerings and reducing overlap, sharing infrastructure, and increasing student mobility to strengthen equity in access. The policy was not seeking to promote mergers. The timeline for *academisation* was initially very tight, but relaxed one year after the initial legislation.

The legislation left the practical means of achieving these goals somewhat vague and actually expanded certain areas of institutional autonomy, granting institutions considerable discretion as to how *associations* would work. What was outlined was that *associations* were legal bodies required to: offer a rational supply of programmes; co-ordinate educational profiles, student guidance and transfers; develop long-term plans for educational innovation and improvement, scientific research, and scientific and social services provision; and supervise the link between research and teaching in UCs offering academic education (Huisman and Mampaey, 2017). Initially, the government aimed to establish *associations* on a regional basis, but ultimately let UCs associate with a university of their choice, aside from the Catholic University of Brussels which was considered too small.

Other government instruments complemented this legislation. On the QA side, UC academic programmes were required to meet *academisation* criteria to be accredited by 2012/13 (accreditation is required to receive government funding). On the funding side the government provided EUR 37.5 million between 2002 and 2006 without specific requirements for how these funds should be spent, as well as some supplementary

research funds. For the most part institutions received the funding directly, but some funds went to the *associations* (Bennetot Pruvot et al., 2015). The sector estimates the funding provided accounted for just 10% or so of the costs of integration, but in the end 54% of available resources were not spent (Bennetot Pruvot et al., 2015; Huisman and Mampaey, 2016). UCs used the resources principally to hire additional research staff, as they saw expanding research-based education and research staff development as the primary means of meeting the *academisation* goal.

Policymakers and institutional leaders largely drove the overall policy, with relatively limited controversy. Modest opposition from instructors was not a major obstacle and stakeholders felt there were few alternatives (Bennetot Pruvot et al., 2015; Huisman and Mampaey, 2016, 2017). Throughout the process, the Ministry communicated with institutional associations such as the Flemish Interuniversity and Intercollege Council, as communicating with individual institutions would have been too complex.

The process evolved, preventing fragmentation of research capacity became an important priority over time, and ultimately resulted in a much clearer binary distinction and a great strengthening of the university system. A 2012 decree integrated academic bachelor's degrees fully within universities, which translated into a major shift in enrolment: by 2014/15 the distribution of students between UCs and universities was basically equal whereas in 2003/04 three-quarters of higher education students had studied at UCs. Many staff transferred from UCs into universities, including 650 employees to Ghent University (Bennetot Pruvot et al., 2015).

Some argue that *academisation* increased research staff in UCs, but the research-teaching seems to remain limited, with varying outcomes by institution and discipline. No data has been collected on impacts on infrastructure sharing, innovation and human resources management, though here is a perception that resource efficiency improved (Bennetot Pruvot et al., 2015). In terms of infrastructure, institutions developed bilateral agreements to determine usage fees and other compensation paid to UCs owning facilities, including for academic activities and student services (housing, restaurants, sport infrastructure, etc.). On the human resources side, transferring staff typically received whichever institution's employment terms were more advantageous.

Associations were an opportunity that some institutions seized upon more than others. The Rector of the University of Leuven helped shape the overall policy (for example ensuring *associations* would not have a geographic basis) and aggressively pursued partnerships with UCs (Huisman and Mampaey, 2017). The University's *association* now includes five UCs and represents approximately 40% of all Flanders' higher education students, which helps the university secure enrolments. The universities that acted the slowest seemed to end up with the smallest *associations*.

France

As early as the French Revolution of the eighteenth century, France's government tried to regroup autonomous faculties into universities, with limited success (Musselin, 2014). Faculties retained considerable autonomy despite another similar reform in 1968 (Boudard and Westerheijden, 2017). Over the next few decades, universities and research organisations created "associated laboratories" and then joint research units to share labs, but these collaborations were undermined by competition for talent. There were discussions of rationalising institutions beginning in the 1980s, but few concrete efforts and only some cities' autonomous faculties regrouped into universities (Sursock, 2015).

In 2003, however, France experienced "Shanghai Shock" as only three universities and no "Grandes Écoles" or research organisations reached the top 100 of the first global rankings (Boudard and Westerheijden, 2017; Musselin, 2014). Many believed that France's invisibility reflected the fragmentation of its higher education and research into many specialised institutions. Partly illustrating this effect, a Université de Lyon I study found the institution's researchers listed 50 different affiliations in publications (Sursock, 2015). Rankings likely drew attention to other challenges, and a large consultation of researchers in 2004 found a consensus in support of institutional consolidation (Boudard and Westerheijden, 2017).

France's policy response has had two axes: the first to directly agglomerate higher education and research institutions and the second to finance institutional excellence. Both axes coincided with or followed upon 2007 legislation expanding institutional autonomy and allowed significant institutional discretion, pursuing an integrated approach to gradually promote collaboration and consolidation on a regional basis.

Institutional Agglomerations

Higher education institutions began developing local associations in the 1990s and early 2000s (Musselin, 2014). The national and regional governments encouraged these institutional initiatives. The *Pôles universitaires européens* (European University Centres) programme allowed collaborating institutions to secure additional funding and faculty positions for new research and teaching centres, and common training services (Les Échos, 1991). The National Evaluation Committee (*Comité national d'évaluation*) began considering university areas (*sites*) in its evaluations, including taking into account programme duplication, which contributed to the development of the kind of area perspective local governments had long used in their decision-making around institutional infrastructure.

Over time, funding contracts became a key mechanism for encouraging CAM. In 2004 the Director General for Higher Education wrote to universities to indicate that future contracts should have strong aspects relating to collaboration with local partners. Institutions in Lorraine were prioritising collaboration and joint programmes in performance contracts, and concurrently their strategic planning, well before their ultimate merger (Finance et al., 2015). This was similar for the University of Strasbourg, where the institutions actually included their merger plan within the contract mechanism (Musselin, 2014). Coinciding contract maturity dates were the key to joint planning.

The central government's programme to help create *Pôles de recherche et d'enseignement supérieur* (PRES) built on this initial institutional momentum for CAM beginning in 2006. PRES would integrate a small number of research and higher education institutions (including Grands Établissements Publics, Grandes Écoles and universities) to create "virtual and physical campuses" (Boudard and Westerheijden, 2017). The programme complemented regional network initiatives such as the *Réseaux thématiques de recherche avancée* (Thematic Advanced Research Networks) and the *Centres thématiques de recherche et de soins* (Thematic Centres for Research and Treatment) (Sursock, 2015). Participating institutions were eligible for funding and permission to hire additional personnel.

The initial plan was to focus resources on 10 PRES, but there were 26 PRES by 2012 as institutions participated more enthusiastically than anticipated. PRES collaborations focused mainly on doctoral training and other research partnerships in areas of strength, and operated with federated governance structures. Specific activities included: common doctoral schools to co-ordinate doctoral education; shared policies for acquiring, using and maintaining scientific equipment and facilities; joint knowledge transfer initiatives; common internationalisation strategies; and joint attribution of scientific publications (Sursock, 2015).

PRES often gradually became more integrated and also expanded with new institutions or by joining other PRES. PRES in Aix-Marseilles and Lorraine led to full university mergers (Sursock, 2015). The Lorraine PRES managed joint projects across the four participating institutions, provided a framework and assistance in strategic planning, and provided logistical support for the eventual 2011 University of Lorraine merger. Typically, mergers resulting from PRES only involved the universities within the PRES and not the *Grandes Écoles*, but the University of Lorraine merger was an exception. Its inclusion of *Grandes Écoles* actually required that the French Government grant the new university an unusual legal status (that of a "Grand Établissement") permitting greater flexibility in organisation and governance, and especially providing legal protection for *Grandes Écoles* within the new institution to meet an institutional precondition for participation. Local government authorities also played a key role in facilitating the merger.

Not all institutions viewed PRES as helpful steps towards mergers, however. The institutions that created the University of Strasbourg decided to skip the PRES step and merge more quickly than the Ministry advised (Musselin, 2014). Still, the Pôle Universitaire de Strasbourg experience, similar to the PRES, had first led them to pursue joint activities and planning in the early 1990s.

Legislation in 2013 intensified the process of agglomeration by requiring that institutions join *Communautés inter-académiques d'universités et d'établissements* (COMUEs) starting in 2014, whereas participation in PRES had been optional. The government shifted its four-year funding contracts and other funding instruments from the institution level to COMUEs, which left smaller institutions especially little option but to join up. Still, institutions retained considerable discretion in how deeply they wished to integrate, although COMUEs generally integrated more deeply than PRES. COMUEs were usually larger than PRES, in fact some included multiple PRES, and organised on a regional basis – the eventual aim is to have single COMUEs in each of France's large regions (Boudard and Westerheijden, 2016). As of January 1, 2015, most official universities were part of France's 25 COMUEs, with additional COMUEs in development.

These policies have already transformed the layout of the French higher education system, from a constellation of institutions to a smaller set of competitive agglomerations, and consolidation seems inevitable with the further development of COMUEs (Boudard and Westerheijden, 2016). The willingness of institutional leaders to engage in the process surprised many analysts (Boudard and Westerheijden, 2017). Many institutions also pursued full mergers over the time period that the government did not directly intend. Fear of falling behind may have motivated some, especially weaker institutions. Many leaders who best promoted PRES also had a similar profile as scientists leading scientific universities, with prior experience as advisors or experts for the Ministry in Paris, regional authorities and European institutions (Boudard and Westerheijden, 2017). Institutional leadership also pursued the PRES and COMUE collaborations mostly without consulting the internal stakeholders, in part due to short timelines for project funding proposals (Boudard and Westerheijden, 2017). There was some resistance to the process among academics, students and their respective unions, which authors relate to limited consultation but also strong political beliefs.

Excellence initiatives

Excellence funding programmes were the second axis of France's efforts to strengthen its higher education system (Boudard and Westerheijden, 2016, 2017). Under administrations from opposing parties, the highest level of France's government co-ordinated the two main programmes, focused on capital investment.

Plan Campus was the first initiative, designed by former Prime Ministers from different parties and personally authorised by President Sarkozy. The programme aimed to help renovate facilities to meet international standards. Proposals had to demonstrate that capital investments were needed, would improve international competitiveness in teaching and research, and would help structure regional higher education offerings. Meeting these conditions entailed collaboration among institutions, and often institutions formed consortia to apply for Plan Campus, including a site in Paris with institutional departments from multiple PRES. Other proposals were public-private partnerships. In 2008, 12 universities received EUR 5 billion (the original plan was to support 10), and 10 additional universities received EUR 400 million. Contracts between the national and regional governments provided complementary funds.

In 2009, France announced a second major excellence initiative: the *Initiative d'Excellence* (IdEX). A service under the Prime Minister managed IdEX funds centrally, as part of the broader *Plan d'investissements pour l'avenir* (PIA) programme to respond to the 2008 international financial crisis through long-term measures in all areas of public policy. IdEX aimed to raise the whole country's growth potential, and accelerate innovation and technology transfer. An intermediate goal was to concentrate resources within the most internationally competitive research universities, often by facilitating alliances and mergers (Sursock, 2015). In the IdEX first round, eight initiatives secured EUR 7.7 billion over ten years starting in 2010. Recipient institutions were in Paris and four other regions, and had merged, were merging or were at least considering merging. The second round collected applications in 2016 for an estimated EUR 3.1 billion, and all submissions identified merger as a goal likely informed by the first-round results.

The Campus Paris-Saclay is a multi-billion-EUR initiative involving 22 universities, Grandes Écoles and research institutes, which received support from Plan Campus and IdEX to create joint laboratories and shared facilities connected with its promotion of "multidisciplinary clusters of excellence" (Goedegebuure, 2012). To date, the

collaboration is more of a consortium than a merger, in the form of a jointly governed foundation. Merger proponents at the University of Strasbourg considered increased government funding a clear benefit, and the institution secured an IdEX grant governed by a steering committee with representatives from various partners (Bennetot Pruvot and Estermann, 2014).

Even unsuccessful bids could promote collaboration. The Lorraine PRES bid for Plan Campus funding was rejected in 2008, but the institutions pursued the infrastructure development on one of the campuses nevertheless, in collaboration with local governments. The full campus proposal secured support in a later round. The four institutions also prepared an application for IdEX funds, again without success, but with the process further expanding their joint planning.

Evaluations of the PIA found it had a positive impact notably in promoting greater collaboration among different higher education system actors. Nevertheless, France's performance in the Shanghai (China) rankings has yet to improve from these or the country's other collaboration initiatives.

France pursued additional excellence initiatives concurrently with Plan Campus and IdEX. For example, Labex supported innovative scientific teams and Equipex supported the acquisition of intermediate size laboratory equipment.

Germany

The Exzellenzinitiative (excellence initiative) and collaborations with research centres

Germany launched its *Exzellenzinitiative* (excellence initiative) in 2006, financed three-quarters by the federal government one-quarter by states (*länder*) (Bennetot Pruvot and Estermann, 2014). The first rounds to 2011 offered EUR 1.9 billion in funds. The second round from 2012 to 2017 offered EUR 2.7 billion.

The first round included three streams, providing funding for five years. The first awarded EUR 1 million annually to 39 graduate schools to build new doctoral pathways. The second supported 37 "excellence clusters" with EUR 6.5 million annually, based on combining an institution's strongest academic programmes to promote high-quality interdisciplinary research. Finally, the third "futures concept" supported nine institutions with independently approved proposals for at least one graduate school and one excellence cluster to "reorganise […] radically […] to compete against the strongest international standards" (Fallon, 2015). Under the third stream, institutions would receive EUR 14 million annually, in addition to the funds from the other two streams. Winners of the futures concept awards were widely recognised as elite, though this was not explicit. Ultimately more institutions received support under the second two competitions than initially planned – focusing on a set of leading institutions proved a major political challenge.

The Exzellenzinitiative sought to encourage universities to identify priority research areas and become more specialised and differentiated. Studies have found that teaching and publication became more concentrated in certain fields, especially in engineering and mathematics/natural sciences (Frietsch et al., 2017). A key means of encouraging differentiation and research development was through collaboration however. Encouraging proposals to include local partners especially in business and industry was a central priority, building upon longstanding practices in research funding. Collaborations with industry are not a focus of this report, however the programme was the impetus for important CAM between universities and public research institutes – Helmholtz Centres that fall under the jurisdiction of the Federal Ministry of Education and Research (Koschatzky and Stahlecker, 2010).

A key element of Karlsruhe University's successful first-round proposal for futures concept funding was its merger with the Research Centre Karlsruhe to develop the Karlsruhe Institute of Technology. Negotiations to confirm the merger began after the award was confirmed in 2006. Prior collaborative ties were essential to the partnership's success, as was support from the state of Baden-Württemberg and the Helmholtz association, but the merger would deepen gradually. The merged institution operated across the three areas of research, teaching and innovation.

Similarly, a successful second round futures concept proposal promoted the Jüluch-Aachen Research Alliance (JARA) between the Technical University of Aachen and the local Research Centre Jülich. JARA is not a full merger, but has caused the institutions to jointly define goals, make investments, and appoint and train academic staff. JARA focuses on areas of complementary research expertise, and since 2016 JARA institutes have professors with cross appointments between the institutions (JARA, 2017). The alliance also pursues activities in education, sharing of facilities, innovation and services, and may gradually evolve into a merger along the Karlsruhe model (Koschatzky and Stahlecker, 2010).

State-level (länder) initiatives

In 2005, Lower Saxony instigated the merger of the University of Lüneburg and the UAS of North-East Lower Saxony. A major evaluation spurred the decision, finding that research performance in the region was not meeting objectives and could be more efficient (Bennetot Pruvot et al., 2015). The institutions' binary distinction complicated the merger. After consulting with the institutions' boards, Lower Saxony passed a law to establish the new institution's structure granting the university considerably more autonomy as a trade-off for the merger's top-down instigation.

In Thuringia (Germany), the 2014-2020 strategy for higher education set explicit expectations of institutional collaboration in teaching and learning, research, administration and scientific infrastructure, to establish a more coherent system with improved institutional profiling (de Boer et al., 2015b). Specific priorities include collaboration in the delivery of small study programmes (in the humanities, science and engineering) to achieve critical mass, the development of collaboration platforms and joint centres (between universities, UAS and research institutes), and the establishment of joint study programmes, graduate schools, etc. In alignment with the strategy, the state is allocating 5.5% of institutional funding to a General, Design and Innovation Budget, comprised mostly (EUR 10 million out of 17.5 million) of a general "performance fund", which prioritises collaborative projects across institutions. The state has also identified increased collaboration among institutions, as well as with research institutes and

industry, as a priority within its four-year framework and bilateral agreements. Priority themes for collaboration include patenting, start-up networks, gender equality, marketing and institutional accounting.

Ireland: Clusters and technological universities

Ireland has historically had a binary higher education system, comprised of universities and Institutes of Technology (IoTs). Partnerships among institutions were considered rare until roughly the late 1990s, but have since expanded considerably in frequency and scope (Harkin and Hazelkorn, 2014).

The Programme for Research in Third Level Institutions first promoted collaboration and coherence in 1999 and over five cycles to 2010 channelled approximately EUR 1.2 billion from the Exchequer and private sources to recurrent and capital infrastructure projects (Davis and Fenton, 2015). The OECD's 2004 Review of the Irish higher education system commended the programme for promoting institutional collaboration, which was a requirement for proposals, including across the binary.

In 2006, the Higher Education Authority (HEA) established inter-institutional collaboration as a prerequisite for its Strategic Innovation Fund (Harkin and Hazelkorn, 2014). Spending equalled EUR 92 million from 2006 until cancellation in response to the financial crisis in 2012, and supported collaborations in labour-market relevant projects, internationalisation, innovation in teaching and learning, and graduate education and research. Specific initiatives included: the Dublin Region Higher Education Alliance; and the National Academy for the Integration of Research, Teaching and Learning. The National Academy later became the National Forum for the Enhancement of Teaching and Learning, which provided funding for collaborations such as the 3U group (Davis and Fenton, 2015). Science Foundation Ireland programmes also promoted research collaboration over this period. The financial crisis reinforced the push for CAM to increase efficiency. Areas of focus included mainly back-end administrative activities and services, while system agencies also merged.

Even though institutions primarily undertake academic planning in Ireland, the government has also spearheaded national level academic planning, informed by thematic reviews, to ensure an adequate matching of supply and demand for seats in strategic areas or higher cost disciplines. Each thematic review has considered different dimensions of quality, relevance, cost-effectiveness and accessibility, "with the assistance of an expert advisory panel comprising public policy analysts, academics, relevant practitioners and representatives of students and relevant employers", comprised of a mix of national and international members (Expert Group on Future Funding for Higher Education, 2015).

The 2011 *National Strategy for Higher Education to 2030* identified clustering, alliances and mergers as a key part of a strategy to develop "a coherent and sustainable system of HE to meet the economic and social needs of the country, within its broad ambition to create an export-driven knowledge economy" (Harkin and Hazelkorn, 2014). This placed systemic restructuring through CAM on the agenda. For Davis and Fenton (2015), the

strategy shifted Ireland's strategy from supporting institutionally-initiated collaborations to prescribing specific alliances and clusters. The strategy was followed by a series of consultations and reports that further reinforced and refined the restructuring mandate. However, some reports recommended steps in excess of what the government has considered feasible or desirable, such as a 2012 international panel report that recommended merging nearby universities and IoTs, considering the binary divide an "artificial barrier".

The strategy emphasised especially regional clusters of collaborating institutions. The HEA stated: "mergers might or might not happen but clusters must happen" (in Harkin and Hazelkorn, 2014). The two key cluster objectives were shared academic planning, to account for system-level concerns of coherence and reducing duplication and fragmentation, and enhanced student pathways (Finnegan, 2015). Broad activities would include joint programme planning, collaborative research and outreach, mutual credit recognition, and joint economic and social development strategies, while more specific activities have included standardised academic calendars, joint graduate schools, joint programmes, joint management and academic quality assurance structures, and an online mapping tool detailing all FE courses and their pathways into higher education.

Mergers would aim to enhance the clusters while creating stronger institutions. The plan as of 2015 was to reduce the institutional complement from 39 to 13 by amalgamating IoTs and consolidating and absorbing smaller institutions into the university sector (Expert Group on Future Funding for Higher Education, 2015; Finnegan, 2015).

According to Finnegan, IoTs mergers have been interpreted as the "primary mechanism" for pursuing clusters, and would be expected to rationalise, generate economies of scale and improve instruction. The government's key policy measure, based on legislation introduced in 2014, has been to offer re-designation as Technological Universities to IoTs that consolidate into larger institutions and meet certain other requirements. These additional requirements present a challenge for IoTs however given their traditional focus on teaching, the most important being doctoral degrees or equivalent professional and academic preparation among at least 45% of full-time academic staff, and sustained research and development activity among doctoral faculty. The risk for those that did not pursue mergers, however, would be to become third-tier institutions. Building on prior collaboration, including in sharing ICT functions, two groups of institutions appear to be negotiating near-term mergers (no sooner than 2018), while another group has aimed to more gradually intensify their alliance towards merger (Finnegan, 2015).

On the university side, institutional CAM has ranged in intensity. In teacher education, many institutions already offered their degrees in collaboration with local universities, and mergers have been the primary pathway to further tighten these linkages. As of 2015, teacher-training institutions would be consolidated from 19 to "six centres of excellence based in universities", based on the recommendations of a thematic review. For Arts and Media programmes and institutions, the government does not envision institutional consolidation so much as less intensive collaborations and alliances to ensure programme diversity, credit transfer, and post-graduate programme consolidation (Harkin and Hazelkorn, 2014). Comprehensive university alliances have sought to link institutions on a regional basis (Expert Group on Future Funding for Higher Education, 2015).

The government has aimed to connect its strategic aims with various funding changes. In terms of operating grants, in 2014, the HEA converted EUR 4 million in operating funding into rewards for institutions more active in pursuing regional clusters and their core two objectives, while another proposal has been to shift to enrolment-based funding

– seen as dis-favouring smaller institutions. The HEA also aims to adjust funding instruments to provide added support for joint programmes or shared modules, provided they are the most efficient method for delivery. Another priority has been to engage collaborating institutions in joint strategic dialogues, even though success metrics under compact agreements remain focused on individual institutions.

As of 2015 most changes were pending, due in large part to economic challenges that complicated efforts by constraining institutional funding and spending (Davis and Fenton, 2015). Harkin and Hazelkorn (2014)also note that clusters "pose more far-reaching challenges" than mergers, however, based on their alignment with regional economic development strategies and infrastructure, and the new Technological University status may have distracted from this priority. Cluster maps have also been changed various times since 2011, which has made implementation more difficult (Finnegan, 2015).

Japan

The profile summarises a national case study prepared for the peer review project by Professor Akiyoshi Yonezawa of Tohuku University. It examines many different areas of collaboration and consolidation across the Japanese higher education system.

Institutional mergers and acquisitions

Japan is faced with sharply declining student numbers. Smaller age cohorts substantially offset rising participation rates, but with participation rates now stabilised, falling numbers will exert great pressure on the finances and solvency of higher education institutions.

Mergers, principally in 2003/4, have reduced Japan's complement of national universities from 100 to 87. These mergers accompanied the transition of national universities from the legal status of state agencies to public corporations. The number of junior colleges in Japan has fallen from 598 in 1996 to 341 in 2016, stemming from a demographic decline and a shift in women's interest towards four-year co-educational institutions. The government has also encouraged junior colleges to convert into universities, and upgrading and/or mergers with local partners have been particularly common among national and local public junior colleges to fulfil job security guarantees to staff.

Although some private and local public universities have faced enrolment pressures and financial difficulties, only one private university has been closed. Government policymakers have modestly reduced national university enrolments to preserve private sector market share, while school corporations that own private higher education institutions and business corporations have chosen to maintain or acquire private higher education institutions since this confers prestige. Some municipal governments have also acquired private universities to prevent their closure, while others have opened new institutions or pursued consolidation.

Collaborations and alliances

Sharing instruction

National government policies place constraints on instructional co-operation. Institutions must take full responsibility for the education and supervision of their own students, students must obtain more than half of their total degree credits at their home institution, full-time or associate professors must be in charge of "essential classes", and institutions must endeavour to have such professors, instructors or assistant professors deliver other types of classes. No specific legal procedures address international joint programmes, but the Ministry for Education, Culture, Sports, Science and Technology (MEXT) and quality assurance agencies have various tools to regulate the offer and MEXT has published guidelines requesting that institutions rigorously assure the quality of foreign partners.

Co-operation among Japanese higher education institutions with respect to education programmes is very limited. Co-operation among higher education institutions in the joint development and delivery of academic programmes is rare.

Japan has widespread recognition of credits, due largely to the nationally standardised credit system under the Standards for Establishing Universities. In most major cities and some other localities there are university consortia (often involving smaller institutions) engaged in credit sharing, such as the Consortium of Universities in Kyoto that has fifty member institutions that share classes mostly in general fields such as "Kyoto studies". Many institutions also rely on the Open University of Japan to offer their students more diverse course options in terms of subjects (particularly in language and general education) via online delivery.

Institutions also commonly outsource instruction, especially in language classes where traditional academic staff cannot meet the demands. The courses may be equivalent to regular classes at the university where this instruction is officially recognised as part of MEXT-authorised university education. Outsourcing agents can include corporate foundations, venture businesses or corporate subsidiaries to higher education institutions. Instruction may be delivered online by instructors in foreign countries (e.g. the Philippines).

Japanese higher education institutions have developed fewer than one dozen joint graduate and undergraduate programmes, concentrated in niche fields with high per-student costs of instruction. In the past decade, the government has support the development of united graduate schools as consortium arrangements involve sharing off staff and facilities among institutions that otherwise would have insufficient capacity to offer graduate degrees. In 2016 less than 1% of graduate students attended Japan's 17 united graduate schools however.

Sharing human resources

National standards establish strict restrictions on sharing of faculty: full-time professors may only be employed and pursue academic activities at one university. Nevertheless, some full-time faculty work part-time at other institutions and the rules on cross appointments also appear to be relaxing. In 2014, the Ministry of Economy, Trade and Industry and MEXT issued guidelines for cross appointments to link universities and industry. MEXT and quality assurance authorities remain concerned about possible risks, including conflicts of interest.

Sharing of administrative staff is more common. Within both public and private institutions, human resource development divisions often use rotation-based job allocation. Moreover, before 2004 public university staff were considered civil servants and rotated through various public institutions to gain experience. Finally, larger corporations often operate local public universities and private institutions and may transfer staff across their different institutions.

Sharing services, administration and facilities

Student services and administration is an area of joint provision in Japanese higher education. The Japan Student Service Organisation (JASSO), established by the government in 2004, amalgamated a separate student loan agency and organisations responsible for international student services is a single national administrative corporation that provides national scholarships and loans, support for international students, and services relating to disabilities or career development. Private universities also frequently co-operate to obtain shared student services, such as housing, bus services, gardening, information services, etc. Institutions may commission these services from affiliated companies, or use temporary staffing agencies.

The government has encouraged sharing of facilities to achieve efficiencies and generate external income especially in research, and such co-operation is fairly commonplace. Inter-university research institutes support research activities that would be too expensive for institutions to pursue alone. Public-private partnerships are also common.

The Netherlands

This profile summarises a case study completed for the peer review project by Professor Harry de Boer of the Centre for Higher Education Policy Studies at the University of Twente. Rather than focusing on a particular initiative, the review considers patterns and policies of institutional collaboration more broadly.

The Act on Higher Education and Scientific Research (*Wet op het hoger onderwijs*, WHW) provides an enabling framework for institutions to pursue diverse types of collaboration without ministerial consent. The act explicitly addresses "collaboration between publicly funded institutions of higher education", establishing guidelines for processes and the governance of collaborative relationships.

Mergers and alliances

Mergers among research universities in the Netherlands are permitted by law on the initiative of universities, and have not occurred. In contrast, there have been hundreds of UAS mergers since 1983, with several creating multi-campus institutions across different communities. The degree to which merging institutions actually integrate their activities, identities and governance varies.

Strategic alliances have occurred widely within the two binary sectors but only to a very limited extent across the binary division. Some alliances have responded to government imposed reforms such as the "Task Division and Concentration" reform of the late 1980s, while the national government has also provided funding to support different co-operation initiatives, and at least one alliance began as part of the participating institutions' performance agreement. Municipalities have in some cases played a role in promoting co-operation among institutions, but in most instances institutions themselves drive the establishment of alliances.

Inter-university research schools – which involve two or more faculties from multiple universities – are widespread in the Netherlands. The article of the WHW addressing these collaborations does not mention UASs, and at present it appears that no UAS participate. Most initiatives aim to offer modules for PhD candidates from the partnering faculties/universities, and facilitate co-operation among and across both PhD candidates and academic staff.

Collaboration in instruction

Dutch higher education institutions offer 45 accredited joint degree programmes, 30 of which involve multiple Dutch institutions and most of which are at the masters' level. There are no special legal requirements for institutions to offer joint programmes. Study programmes require ministerial consent, however, and also must meet accreditation requirements.

The digitisation of course content and supporting instructional services creates – in principle – new opportunities for students to access courses from many institutions, and for institutions to co-operate in developing courses and supporting instruction. This is supported in some respects by national authorities. The national quality assurance body (NVAO) promotes institutional use of the E-xcellence instrument to assess online and blended learning, and participates in the development of this and similar instruments at the European level. The Dutch Ministry of Education, Culture and Science aims for all educational materials to be available online by 2025.

At the same time, the further use of digital learning has been constrained by a range of policies. The WHW requires that educational programmes include a "coherent whole of educational units" which would be violated by the unbundling of content and/or instructional services. Minimum contact hour requirements for the first year of University of Applied Science bachelor programmes require physical contact, restricting digital provision. Programmes must be offered largely at the physical location (municipality) mentioned in the central register for higher education programmes. Under a recent modification of the rule distance education will now meet the local requirement if provided by the core institution, but not a partner institution. Finally, institutional exam committees must determine whether to recognise credits within a programme or for admissions, which obligates them to assess the quality, level and content of other institutions' online programmes.

Collaboration in research and engagement

The government supports research collaborations both among higher education institutions and between them and the private sector, through grants and other conditional funding. Universities and UAS tend to benefit from different programmes.

Since 2010, UAS research is concentrated in Centres of Expertise, which are public-private partnerships and receive a part of institutions' annual performance funding. Universities are partners in a small subset of Centres of Expertise. UAS-led consortia can also receive knowledge circulation grants for engagement activities, which have involved almost 4 600 companies and 6 000 professionals since 2005.

The government has been supporting university research collaborations since at least the late 1990s. The Gravitation Programme (*Zwaartekracht Programma*) supports consortia of top university researchers for personnel, infrastructure, equipment and materials, as well as some management costs. In 2016, approximately EUR 110 million was available under the programme for ten year commitments, and in 2017 six proposals each received total subsidies of almost EUR 19 million. The Smart Mix subsidy programme has an annual EUR 100 million budget, to support consortia of knowledge institutions and knowledge users particularly in ICT, nanotechnology, genomics and life sciences).

Sharing human resources and facilities

Apart from national framework conditions established in collective employment agreements for faculty and staff, Dutch higher education institutions are highly autonomous with respect to personnel policies, and able to establish join appointments. Large numbers of staff hold joint appointments between different higher education institutions or Higher education institutions and the private sector. PhD candidates also often work part-time in industry or other public-sector organisations.

The government has also directly supported sharing of human resources. It and other parties directly fund joint appointments between UAS and universities, private companies, public-sector organisations, or other UAS, which are called *Lectors*. Over two years, the government also spent EUR 180 million supporting secondments of industry knowledge workers towards "public knowledge institutions" (mainly universities and UAS) for periods of up to 1.5 years.

Dutch higher education institutions own their buildings and property, which allows them flexibility to use these in co-operation with partners. Often sharing of facilities is pursued at the grassroots, including through rental arrangements, although often it is one component within larger strategic alliances mentioned earlier. Funding for research infrastructure may only be available to consortia, as in the case of the Gravitation Programme.

Collaboration across the binary divide

The Netherlands has firmly protected the binary division between universities and UAS. Joint degree programmes between universities and UAS are forbidden. In the view of most higher education leaders in the Netherlands, institutional mergers across the binary divide are forbidden – though some uncertainty remains. In the early 2000s the Minister of Education planned to introduce a bill to facilitate mergers between universities and UAS by clarifying rules affecting mergers and the relevant standing of staff. This did not move forward due to concerns that mergers would break down the distinct missions of the different types of institutions.

Alliances between research universities and UASs have been relatively rare and generally not been very successful. This is due principally to divergent institutional cultures and worker employment conditions. Research programmes also rarely support collaborations

between universities and UAS, with some centres of excellence representing the key exception.

Norway: Mergers of universities and university colleges

The Government of Norway has taken diverse approaches to promoting institutional mergers. It actively initiated and forced mergers in the 1990s, then from 2000 to 2013 supported voluntary mergers before again adopting a more assertive approach (Kyvik and Stensaker, 2016).

Norwegian higher education, beyond universities, developed through the creation of territorially distributed professional schools and colleges, resulting in a fragmented system of small institutions. In the late 1960s, Norway created some district colleges offering short-cycle programmes, then in 1976 it introduced joint development boards for institutions in Norway's 17 regions, but these efforts were only modestly successful in reducing fragmentation at best (Kyvik, 2002).

A 1988 study recommended that colleges merge to create larger academic units within each region that would be more efficient and easier for the government to oversee. Six years later, 83 teacher-training colleges, engineering colleges, health education colleges, social work conservatories, music conservatories and other specialist colleges merged into 26 integrated colleges. Formerly autonomous campuses typically became geographically distributed departments. The reform was largely uncontroversial as the college system's challenges were widely recognised, economies of scale arguments were widely accepted and political opposition was weak. Similar changes took place across the public sector in this period.

This merger process helped to establish Norway's binary system. The new colleges – later referred to as university colleges (UCs) – provided an array of short-cycle professional and vocational study programmes, as well as some university programmes for basic, undergraduate and graduate education in areas where no universities operated. Norway's four comprehensive universities and six specialised university institutions provided academic undergraduate and graduate programmes, including research training, and undertook basic research.

There was only one university merger in this period. The government forced a university to merge with district colleges in 1996. In another case four university colleges and a university (Tromsø) agreed to a merger that the government rejected in order to protect the binary division (Arbo and Bull, 2016). The institutions therefore signed extensive collaboration agreements and committed to merging later (within ten years).

Nevertheless, the binary division was beginning to break down.[2] Colleges introduced the university rank system in 1995, and the next year the government approved a common act to regulate all higher education institutions, aiming to promote stronger co-ordination of academic programmes between the university and college sectors (Kyvik, 2002). The act indicated that colleges should engage in research and teaching should be research-based.

The government permitted colleges to apply for accreditation of PhD programmes in 1999.

In 2000, a National Commission proposed that colleges and specialised university institutions that fulfilled specific requirements be permitted to become universities. A 2004/05 reform programme implemented this policy, established a new QA agency (NOKUT) and expanded institutional autonomy, aiming to promote institutional diversity without breaking down the binary divide (Kyvik and Stensaker, 2016). Criteria for university status related to "primary purposes, organisation and infrastructure, the quality and stability of research or professional/artistic activities, and links with academic networks" (Elken et al., 2016). More technical requirements addressed research activities and included offering master's degrees in five or more fields and PhDs in four or more fields (Kyvik and Stensaker, 2016). In an effort to de-politicise the process NOKUT gained responsibility for approving changes in institutional status, though the Ministry retained a veto. Norway would continue with only four comprehensive research universities; new institutions were to have more specialised profiles.

The government did not offer direct incentives for institutions to change status. However, university status offered colleges higher profile and a pathway towards attracting and retaining research staff (Kyvik and Stensaker, 2016). Universities were also entirely self-accrediting, whereas colleges required accreditation for their master's and doctoral programmes (Elken et al., 2016). The government did not seem to appreciate in advance the extent of these advantages' appeal for university colleges.

Three colleges advanced to university status directly: the University of Stavanger in 2005, the University of Agder in 2007, and the University of Nordland in 2011. Colleges also developed a host of master's degree programmes with low enrolments. However, mergers were colleges' strategy to pursue university status that is most relevant to this study.

A 2008 independent commission report had boosted momentum for mergers by calling for further consolidation, including through abolition of the binary division and mergers of all public colleges with existing universities (Mathisen and Pinheiro, 2016). The government supported the commission's direction but allowed institutions to proceed voluntarily, while exercising final right of approval and providing financial resources to support at least some mergers (Arbo and Bull, 2016).

In total, Norwegian higher education institutions pursued 14 merger proposals from 1999 to 2011, of which four led to mergers (one was still in negotiation as of 2013). The successful mergers each involved only two partners and were institutionally initiated. Two colleges formed the Oslo and Akerhus UC in 2011 and another two became Buskerud and Vestfold UC in 2013. Many merger proposals were across the binary divide, with further objectives to enhance competitiveness for resources and students (including through greater geographic coverage) and to amalgamate similar study programmes and achieve efficiencies. The University of Tromsø absorbed the UC of Tromsø in 2009 and then Finnmark UC in 2013. In terms of proposals that did not go ahead, the new University of Agder and the Norwegian University of Science and Technology each rejected proposals from local colleges as deviating from their strategic emphasis on research. Local colleges turned down two other universities, in one case due to historical conflicts, geographic distance and fears of take-over.

In 2013, a newly elected government judged that the voluntary merger approach had failed and adopted a more assertive strategy. Concerns included programme duplication,

too small programmes, and excessively small colleges having limited administrative capacity to meet requirements for education provision and research environments.

In spring 2014, the Minister instructed all higher education institutions to identify a strategic profile for 2020, measures to achieve the profile in a context with fewer institutions and higher expectations for teaching and research, and steps to strengthen performance through mergers, providing replies by early 2015. The Minister also engaged in dialogues with institutions to support this process. The underlying threat was that the government would force institutions to merge if they did not do so voluntarily. The government blocked progression to university status until agreement had been reached on a new system structure, but also committed to provide funding and support the creation of world-leading research environments. The process led to four provisional merger agreements involving ten institutions: three between colleges and universities and one among UCs, conditional on permission to apply for university status.

The government was dissatisfied and introduced a White Paper on structural reform in the university and UC sector in March 2015, which envisioned a smaller network of stronger institutions, to achieve the goals of: "high quality education and research; robust academic environments; good access to education and skills across the country; regional development; world-leading research environments; and efficient use of resources" (European Commission, 2016b). The government required that institutions use specific quality criteria to determine if they could stand on their own or should merge with other institutions, and introduced stricter requirements for establishing master's and doctoral-level programmes, and for becoming and maintaining accreditation as a scientific UC and university (European Commission, 2016b). It also introduced funding to support mergers including in the research institute sector, starting with EUR 9 million in 2015 (Bennetot Pruvot et al., 2015).

These measures accelerated consolidation. In 2016-17, nine mergers involving 22 institutions reduced the total complement of state higher education institutions from 33 to 21 (Current Research Information System in Norway, 2016; Ministry of Education and Research, 2016). Four mergers involved the absorption of seven UCs into universities, four mergers were of UCs (in one case four private UCs), and in one case two research institutes merged with a UC. One merger took two steps to integrate three institutions.

Romania: Encouraging university mergers

For a population of under 20 million people, Romania, has roughly 100 universities, half of which are public (Andreescu et al., 2015; Munteanu and Călin Peter, 2015). Its many national research and development institutes operate mostly in isolation from universities (which conduct a relatively small share of research and development by European standards), creating an atomised research structure that the World Bank has recommended consolidating. The government has repeatedly indicated that consolidation is a priority, seeking greater institutional heterogeneity and financial efficiencies. It has adopted legislation directly regulating mergers and consortia, and an innovative classification and ranking structure aimed at spurring institutional initiative.

Romania's Law of University Consortia (287/2004 – *Legea consorţiilor universitare*, LCU) has greatly constrained collaborations. It allows universities to participate only in a single consortium and limits the objectives that institutions may cite as formal rationale for joining a consortium, and previously only permitted absorptions (universities could not pursue mergers that created a new entity). Recent legislation has been more favourable to collaboration however. The Law of National Education (1/2011 – *Legea educaţiei naţionale*, LEN) in particular explicitly aimed to favour stronger institutions absorbing weak institutions, and amended the LUC to allow non-absorption mergers. The government has also indicated that future legislation will ensure poorly performing institutions are absorbed.

The LCU established a system for classifying universities in three categories: research-intensive, research-and-education, and education-centred, as well as a programme-level ranking system. Classification is based on: a research indicator (derived from measures of publication influence and publication outputs); an institutional evaluation indicator (tied to ratings in the Romanian Agency for Quality Assurance in Higher Education's institutional evaluations); and an aggregate indicator (based on research, teaching and learning, engagement and institutional capacity). Overall the classification privileges research, though certain criteria relate to administrative costs. It tends to favour institutions that are larger, comprehensive, and well-established; i.e. traditional public universities. The algorithm seems also to favour particular types of mergers, such as those of institutions with similar profiles and of universities and research institutes (Andreescu et al., 2015).

The classification algorithm considers institutions' relative positions in a way that amplifies competitive incentives. Improvement in one institution's position could lower those of others. This could help to stimulate institutional competition for merger partners, but by reinforcing competitive pressure might also weaken incentives to pursue some forms of collaboration.

Public opinion, many institutions, academics and even government offices have treated the classification as an institutional ranking system identifying quality and prestige, in the absence of other national institutional rankings. The government has also implemented or planned various policy measures to reward institutions with higher classifications. Research-intensive universities may offer doctoral education and should receive greater funding for graduate studies. The National Council for Funding Higher Education has also proposed to allocate its "supplementary" institutional funding stream based on programme rankings once they are introduced, instead of current quality indicators. The LEN also indicated that the government would develop a formula to favour consortia and merged institutions in the distribution of operating grants, but this has been delayed. The government has not committed to financing the implementation of mergers and consortia (Munteanu and Călin Peter, 2015).

A common concern with the LEN is that it does not specifically outline how CAM should be implemented (Andreescu et al., 2015; Munteanu and Călin Peter, 2015). However, the Ministry of Education, Research, Youth and Sports approved a pre-contract between institutions participating in one merger, establishing conditions of the merger, rights and obligations of both sides, property arrangements, and a timeline for completion. The final merger contract also required Ministry approval, while legislation had to dissolve the absorbed institution and transfer its rights and obligations.

The LEN applies only to public universities, which most merger projects have focused on (Andreescu et al., 2015). This is a challenge for the private half of the system however,

and leaves considerable ambiguity that complicates the public-private mergers that could be strategic for many Romanian cities. Institutions reportedly abandoned at least one public-private merger proposal partly due to legal uncertainties. Classifications and rankings do include private institutions however and could incentivise them to pursue CAM through their reputational effects in the market, given especially how declines in the student population are increasing competition for enrolment.

Other policies have also encouraged CAM. Romania's QA system grants larger institutions various advantages, which smaller institutions may accept absorption to attain. Romania has also shifted its research institutes from various ministries into the Ministry of National Education, which could facilitate mergers with universities.

To date, the LEN and related measures have not greatly boosted merger activity. Some institutions have pursued merger proposals, and the new legal framework was clearly facilitating. Merger proposals often began before classification results were released, however, and it does not appear to have been an important driver.

Spain: The Campus of International Excellence programme

The Campus of International Excellence (Campus de Excelencia Internacional, CEI), launched in 2009, was a key element in Spain's *2015 Universities Strategy*. The CIE sought to promote systematic collaborations among universities' academic centres, institutes or facilities, as well as with external research bodies or other public and private agents (Seeber, 2017). Initiatives addressed education, research and innovation, and focused particularly on: biomedicine/health; environment and sustainability; social sciences and humanities; and biotechnology (Delgado and León, 2015). Sub-goals included establishing "campuses of global recognition" with better rankings, fostering partnerships with external (especially economic) actors, achieving economies of scale, better co-ordinating course offerings, and optimising facilities investments. Mergers were not a priority *per se* as Spain has relatively large higher education institutions.

Under the CEI, Spain's central government offered institutions EUR 686.7 million through three competitions in 2009, 2010 and 2011. The majority of the funds (84.5%) were initially to take the form of loans with 0% interest, reimbursable in 15 years, with the balance comprised of grants. The financial crisis led to a redesign however, forcing up interest rates on the loans to 5.67%, and causing no funds to be allocated in 2011 (Bennetot Pruvot and Estermann, 2014).[3] Spanish law also makes regions responsible for universities' financial stability, so the central government had to establish bilateral agreements with each region for the loan program (Seeber, 2017). Under regions' financial supervision, institutions had full autonomy in managing funds and implementing projects.

The CEI originally targeted an elite subset of institutions. However, response to the programme was greater than expected and attempts to exclude regions provoked significant political push-back. Consequently, like many other excellence initiatives, the CEI became far more inclusive, including in 32 separate projects almost all the country's

universities (excepting some private institutions) and research centres, 74% of companies on the Spanish exchange index, and many other groups (business associations, hospitals) (Delgado and León, 2015). All evaluations found selected campuses achieved the "excellence" label even though some were found to have accomplished limited progress. A few examples of projects provide a clearer sense of the overall effects of the CEI.

Barcelona Knowledge Campus initiatives included double degrees (including Erasmus Mundus Master's degrees), a joint Innovation and Technology Centre, support for entrepreneurship and tech-based start-ups and spin-offs, research collaborations, co-operation in international relations (including agreements to allow Chinese universities' students to take courses), sharing of best practices, and a joint management and communication unit (Delgado and León, 2015). The two Barcelona Knowledge Campus universities were complementary and had major nearby facilities, but little history of collaboration, and received over EUR 46 million in support, including EUR 7.1 million in grants.

Carlos III University led an aggregation of Madrid institutions aiming to create a sustainable interurban campus for the region, with a focus on achieving excellence in social sciences, engineering and humanities research, knowledge transfer and instruction (Bennetot Pruvot and Estermann, 2014). Governance structures included a board chaired by the Carlos III University president with representatives from the other institutions, local and regional government, the private sector, and independent research bodies. Senior university leaders joined the aggregation's other administering bodies.

The Autonomous University of Madrid and the ten national research council centres located on its campus (among other partners) built upon a long history of collaboration in forming a CEI that received EUR 24 million. The CEI focused on attaining the leading position in Spain in teaching and research in four disciplines (Delgado and León, 2015). Activities focused on strengthening joint scientific infrastructure and other co-operative initiatives (such as the *Biocampus*), as well as programmes to attracted talented students (*Graduate Programmes of Excellence*) and staff. The CEI invested most of its EUR 24 million in funding in new scientific infrastructure and campus buildings. The CEI was evaluated as having made good programmes in teaching, research, and the development of the "social model" on campus, but less on firm linkages and tech transfer.

Finally, the CEI Montegancedo's (Technical University of Madrid) I2/Tech project prioritised collaboration on user-driven open-technology innovation, partly through the creation of new joint research centres or labs. Much of the CEI's emphasis was international, including joint graduate programmes and incubator collaborations with foreign institutions.

An overall evaluation found the CEI programme increased university interactions, including through the establishment of new campuses of university partners located in the same community (Seeber, 2017). The practical implications of these greater interactions are unclear, however. The financial crisis undermined the CEI programme; as did concurrent Bologna reforms.

Sweden: Mergers

In the 1970s, Sweden's most important process of restructuring and concentration in higher education produced a system with six comprehensive universities, five specialised universities, and 12 teaching-only UCs (universities supervised what little research was done within these institutions), as well as five university regional boards to co-ordinate education programmes (Benner and Geschwind, 2016).

The government began to expand UCs' research role in the 1990s by providing them greater research funding, and the rights to hire professors, to conduct doctoral training independently from universities (after assessment), and to apply for university status. These policies generally reduced the connections between UCs and universities, however in pursuit of university status, UCs merged to create Mid Sweden University with the support of regional authorities (Ljungberg et al., 2015). In total four UCs obtained university status, although more proposals were prepared.

Policies began to solidify the binary system again around 2003, and institutions began collaborating more once again, with the support of steering agents. Research funding organisations encouraged collaborations to create centres of excellence. The government also provided some support, for example funding a shifting of programmes between Växjö University and UC Kalmar in 2002-2003 to avoid duplication and local competition for students – Växjö took on all modern languages except English while UC Kalmar concentrated biology instruction (Geschwind et al., 2016).

Gradually, the government became more invested in supporting collaborations. It explicitly communicated its support for strategic alliances and mergers. One idea was for newer, smaller and regional universities and UCs to operate as satellites to older research universities, but UCs were also encouraged to form alliances with one another (Ljungberg et al., 2015). The government used funding measures to support CAM. More competitive funding based on quality and performance, particularly in research, was a key framework policy, while in 2007 the government introduced small funding envelopes (total EUR 11 million) to directly support implementation (Benner and Geschwind, 2016). The government's overall stance emphasised voluntary CAM, but seemed to imply it would intervene very assertively if institutions were recalcitrant, which it in fact did.

Five mergers took place between 2006 and 2014, while many more were proposed. The following four are in order of increasing government forcefulness. Växjö University and UC Kalmar initiated their merger but received EUR 6.5 million in support (funds largely backed the work of different committees and working groups), and the government appointed the new Linnaeus University's "pre-rector" and "pre-board" (Bennetot Pruvot et al., 2015; Geschwind et al., 2016). The Ministry of Higher Education and Research encouraged the absorption of Gotland UC by Uppsala University due to Gotland UC's poor financial position, including by offering merger funding and removing Gotland UC operating funds for "non-utilised student places" (Karlsson and Geschwind, 2016, p. 153). The Ministry asked the three specialised universities that became the Stockholm University of the Arts first to pursue an alliance, and then specified they should merge to strengthen their research activities. Finally, the Ministry directed Stockholm University's absorption of the Stockholm Institute of Education (SIE) through a press release, based on academic concerns and over SIE objections (Karlsson and Geschwind, 2016).

The United States

This Profile summarises a case study for the peer analysis by consultant Elise S. Miller. It focuses on the states of California and Georgia, where public authorities have been leading or stimulating collaborations using public governance or steering bodies. In contrast to European consolidation initiatives that often focus on raising research profiles, US efforts have focused on increasing graduation rates and access for disadvantaged learners by finding new resources through efficiency gains in administration.

State-level policymaking is the most relevant to analysis in the US, but some national policies on institutional accreditation remain important as well. Accredited higher education institutions must seek review and approval of "substantive" changes to their programmes and institutional structures by accrediting organisations – including mergers, new joint programmes, legal status changes, and subcontracting to unaccredited entities. Accrediting organisations therefore play a leading role in channelling collaboration.

California

California has three public higher education systems: The University of California (UCalifornia), the California State University (CSU), and the California Community College (CCC). The state has ascribed each system a specific role and varying autonomy.

The 1965 Master Plan for Higher Education limits direct admission of high school graduates into the UCalifornia and requires that the four-year university systems deliver 60% upper-division (3rd and 4th year) courses and 40% lower-level (1st and 2nd year) courses. These policies channel students entering higher education towards the CCC, with many eligible students later transferring into the UCalifornia or the CSU. The transfer of students from open access and low cost CCC institutions to CSU and UC institution is crucial to state goals for both affordability and college completion, and student transfer has been supported by numerous state initiatives.

The Master Plan made the UCalifornia system responsible for doctoral education and basic research, permitting CSU campuses to offer doctoral programmes only in co-operation with the UCalifornia system. Since 2005, the CSU system has also been authorised to deliver practitioner-oriented doctoral programmes on its own in certain disciplines, and it now awards six percent of doctoral degrees (either research or practitioner) in the public university system.

Recent state initiatives have sought to generate financial efficiencies, promote innovation and improve graduation rates. State policies to promote these goals include expanded use of shared education services (with the UCalifornia system) and, within all three systems, initiatives to establish system-wide online education resources. As of 2017, CalState Online offers a central portal for accessing 31 bachelor's degrees, 79 master's degrees and one doctorate degree fully online, as well as respectively 36, 38 and one hybrid degrees, based from across the CSU's 23 campuses, which enrolled almost 7 500 students. UCalifornia Research Initiatives includes five funding programmes to expand research collaboration across UCalifornia campuses.

Georgia

Like California, Georgia also has differentiated systems of public higher education institutions: the University System of Georgia (USG) and the Technical College System of Georgia. The former comprises institutions awarding bachelor, master, and doctoral degrees, while the latter governs institutions awarding educational qualifications below the bachelor degree level and industry-recognised credentials. The report focuses on the USG.

Mergers

The USG has pursued a systematic programme of consolidation and co-operation taking advantage of its centralised governance structure, to improve graduation rates and preserve or enhance college affordability in a time of decreasing state funding to higher education. The USG Board of Regents approved the merger of eight institutions into four in 2013, then approved five additional mergers from 2015-2017. Each merger involved two institutions. The Board of Regents developed guiding principles for merger planning and implementation and created consolidation committee for each proposed merger with representatives from the participating institutions. In some cases, mergers were imposed on the participating campuses with little engagement with and support from campus-level officials. A follow up study found the 2013 mergers helped improve persistence among first-time students. However, merger savings equalled only 0.1% of the USG operating budget. Mergers have eliminated redundant positions in administration, but generally have not affected the job security of the academic workforce.

Other administrative collaborations

In 2009, the USG began efforts to consolidate campus business functions (human resources, payroll and benefits) into a Shared Services Center (SSC). Representatives from the participating institutions govern the Center, setting its standards, monitoring performance, and establish service-level agreements with institutions. The USG has also sought to improve the efficiency of space utilisation and capital investments by reviewing campuses' physical facilities.

In April 2017, the USG Chancellor announced a Comprehensive Administrative Review to consider administrative costs across system office and institutions. It is expected that the review will lead to the elimination of further positions in administration, but will not consider academic activities and resources.

Academic collaborations

On the academic side of university operations, the USG has required "integrated review" of newly-proposed academic programmes at the system level, including not just academic affairs staff but also budget and facilities representatives. Another process has sought to identify and often eliminate "low performing degree programs" that are often "essentially dormant".

USG institutions can offer dual and joint degrees with the only requirement to notify the USG system office if the component programmes had prior separate approval. Online education has been a clear area of emphasis for improving USG services: online offerings recently expanded from roughly 1 500 to 5 000 courses over three years. Institutional

consortia deliver many online programmes. USG institutions are also part of the Southern Regional Education Board's Electronic Campus initiative, which provides a central portal to search through accredited credit-carrying courses and programmes offered across 16 states.

Some USG institutions also pursue cross-cutting co-operative initiatives at the local level. One example is the Atlanta Region Council for Higher Education, which pursues cross-registration in courses, library collaboration and co-operative purchasing.

Wales: Concentrating universities

Upon devolution in 1999, the Government of Wales (GW) and the Higher Education Funding Council of Wales (HEFCW) began efforts to promote mergers, but they were especially active from 2002-12. Wales had 13 universities, as well as the University of Wales (UW) which was a small body accrediting degrees at constituent colleges and other external institutions (Benneworth and de Boer, 2016). Competition from larger institutions in England and Europe was increasing, and institutions seemed to lack the critical mass to secure research funding from the United Kingdom and the European Union and to invest strategically in improved teaching and research.

The GW used primarily financial measures, information and political pressure to encourage and support mergers. The overall message was that mergers were not about short-term economies, but about realising the higher education system's full potential, including to obtain increased European and UK research funding, expand the portfolio of disciplines and programmes, and provide students and employers the best possible services (Gummett, 2015).

Wales pursued a largely consistent funding strategy. The GW insisted in 2002 that the "case for development and supplementary funding for the sector cannot be sustained" without firm evidence of engagement with structural reforms (Gummett, 2015). Yet HEFCW financial support for CAM was the key policy instrument. The Reconfiguration and Collaboration (R&C) fund from 2002-09 and the broader Strategic Development Fund (SDF) from 2010-12 operated basically the same way, except the SDF focused more on mergers and regional collaborations as of 2011 (Gummett, 2015).

In total, the R&C fund provided approximately GBP 50 million to support proposals for strategic, substantial and sustainable mergers or institutional collaborations in research and teaching (Benneworth and de Boer, 2016). Individual merger grants were worth approximately GBP 10-15 million (Zeeman and Benneworth, 2017). All universities submitted a total of 20 proposals in 2002 and 10 were supported, including four for mergers and strategic alliances. The fund operated on an ongoing basis without a deadline in later years.

Funding operated through a three-step process. First, it helped governing bodies establish a joint working group to develop scenarios for CAM, which then presented a report with a preferred option to be shared with the HEFCW. Second, if the governing boards agreed on a merger, the programme supported joint business plan preparation. Third, the

HEFCW reviewed the joint business plan and decided whether to help finance the structural changes envisioned to achieve efficiency improvements, rationalisation, and growth through a one-off grant. Institutions and the HEFCW negotiated detailed ex ante targets for CAM processes and HEFCW reserved the right to claw back grant moneys in the event targets were missed. These targets were also reviewed relative to performance by independent consultants following mergers, to identify institutional steps to improve outcomes, lessons learned, and recommendations for future processes. Evaluations were published online.

R&C merger funds were overseen by an internal HEFCW committee required to report back to the GW and National Assembly of Wales. The National Assembly also held periodic hearings to hold the HEFCW to account for progress on restructuring and use of funds. While the GW's merger programme as a whole was not evaluated, a 2009 Wales Audit Office review indicated value for money was being achieved, but found progress had been too slow.

The GW's use of political pressure on institutions varied over the period. In 1999, it directed the HEFCW to identify and recommend possible mergers to the National Assembly. HEFCW produced four reports from 1999-2002 that underlined the importance of system restructuring and mergers, which led to the introduction of the R&C fund in 2002. These reports recommended that Wales aim to have just 5-6 universities although the GW did not explicitly adopt this target.

Benneworth and Zeeman (2017) describe the GW's approach from 2002-2006 as *facilitating*. Institutions initiated proposals, often building upon previous collaborations. The HEFCW provided advice, including through regular meetings with senior management and governing bodies and formal resources to assist institutions in planning. Merging and merged institutions also had to send the HEFCW regular updates to maintain accountability. HEFCW maintained this approach throughout the concentration process. In this period, the absorption of the UW College Medicine into the University of Cardiff went through smoothly. Another two institutions (UW Aberystwyth and UW Bangor) established a successful alliance in various areas of research and learning, which HEFCW supported as a possible intermediate step towards an eventual merger, but they did not merge due to distance, other leadership priorities and limited economies of scale (Gummett, 2015). Two other merger efforts failed, however, due to conflicting visions and fears of power imbalances, with just one leading to a limited collaboration in staff development. Other collaborations included other research projects and the transfer of departments.

From 2006-2009, HEFCW began identifying three specific institutions as concerning due to their small size. For example, an independent review found that UW Lampeter had severe income, management, operational and strategic deficiencies. All three institutions submitted R&C proposals, but HEFCWE determined these were inadequate. UW Lampeter eventually merged with the Trinity UC Camarthen to form UW, Trinity St. David, which was still a small institution. Largely as a means of maintaining the college's brand while gaining access to capital funds, the Royal Welsh College of Music and Drama converted to a Private Limited Company wholly owned by the University of Glamorgan, but with its own subsidiary board of directors (Gummett, 2015).

A series of reviews and other events in 2009 spurred a firmer GW push for mergers starting in 2010. In addition to the previously mentioned critical 2009 Wales Audit Office report, another GW review found inadequate collaboration in South-East Wales and faulted autonomous institutional decision-making. The GW asked HEFCW to propose

specific CAM initiatives and identify a blueprint for consolidation addressing systemic sustainability challenges. This blueprint proposed three mergers and established a target for six universities that would meet regional needs. Although there had been a broad sense across the system of what was envisioned since the early 2000s, steering actors had never been so explicit. In an unprecedented move, the GW also threatened to legislate mergers, based on the Minister's power to dissolve institutions under the Education Reform Act (1988). This legal authority was unclear, however, given no Minister had previously used it without institutional consent (Gummett, 2015).

The UW Trinity Saint David and Swansea Metropolitan University merged without controversy to improve credit options for students, teaching resources and relevance. A second proposal to merge three universities ultimately merged just the University of Glamorgan and UW Newport. Regional concerns largely scuttled the various options to merge Glyndwr University.

When Wales suspended its major concentration measures in 2012, its university complement had fallen from 13 to eight. It is not clear if Wales achieved its research and teaching goals, however and its universities remain small by UK standards. Wales' emphasis on communication and funding to promote mergers, but not regulatory approaches, reflected greater institutional autonomy. Funding was particularly influential with institutions approaching insolvency.

Zeeman and Benneworth (2017) argue that growing emphasis on meeting global student demand, at the expense of serving local communities, largely drove the Welsh mergers and the resulting multi-campus institutions' subsequent evolution. New multi-campus institutions invested disproportionately in their metropolitan campuses, developed campus specialisations based on competition for external students and not local need, and at least two opened London campuses to serve international students. One case study university also closed a suburban campus. Preventing disinvestment from peripheral campuses of multi-campus institutions may require targeted public regulation and funding.

Notes

[1] At the time, the Commonwealth Government allocated institutions funded spaces to admit students. Receiving additional funded spaces therefore implied increases in operating grants, as well as growth more generally.

[2] This is somewhat ironic given Kyvik (2002) notes that countering the aspirations of two large regional colleges to gain university status was a discrete objective of the consolidation of the college system.

[3] Moreover, from 2008-2014 Spain reduced block grants to universities by EUR 1.1 billion (after inflation) or 15%

Annex B. Policy approaches to online learning and open educational resources

This annex includes two major components. The first is a detailed look at the development of online learning and related technologies in the US, exploring their implications for institutional collaboration and consolidation. The second component reviews OER and related policies in five OECD jurisdictions.

The development of online learning in the United States

The United States is a fitting case study of the development of online education. It has been a leader in developing this modality and benefits from the best empirical evaluations to date (Freitas et al., 2015).

Online courses date to the mid-1990s in the United States, but built upon distance learning practices dating to the late 1800s (Escueta et al., 2017). Massive Open Online Courses (MOOCs) began in 2007 in the United States and Canada. Stanford faculty established the for-profit Coursera and Udacity platforms in 2012, followed by not-for-profit edX of MIT and Harvard (Freitas et al., 2015; McPherson and Bacow, 2015). Originally, online programmes concentrated in science, technology, engineering and mathematics fields, particularly computer science, but are now available across a range of disciplines (Butler, 2016).

Technological progress was essential to online learning, but the government also had to remove legal barriers. The 1992 Higher Education Act limited federal (Title IV) financial aid eligibility to only students whose institutions' provided half or more of their total course-load in person, meaning institutions had to enrol at least one in-person student for every online student (Deming, Lovenheim, et al., 2016). A 1998 amendment provided waivers to select institutions, and then the rule was removed in 2006.

Basically 0% of higher education enrolment in the United States was at online institutions in 2000, but this figure grew to 1.75% by 2006, and then 4.5% by 2010 (Deming, Lovenheim, et al., 2016). Whereas roughly 10% of students took online courses in 2002, one-third of US higher education students took at least one course with at least 80% online content in 2014 (McPherson and Bacow, 2015). Other data indicate that in 2013, 26% of students took at least one entirely online course and 11% pursued fully online programmes. The non-selective for-profit sector accounts for 33% of online enrolment, and most students in for-profit college chains enrol exclusively online, compared to 2% among selective institutions (Deming et al., 2015; Deming, Lovenheim, et al., 2016). The

non-selective public sector most often combines online and traditional methods (Deming et al., 2015). On top of this, over 25 million students participated in free MOOCs from 2012-15 (Escueta et al., 2017).

The inverse correlation of online learning with institutional prestige and selectivity relates to online programmes typically serving non-traditional students who are older, have parents with lower attainment, are more likely to be single parents themselves, and are more likely to have full-time jobs (Deming et al., 2015; McPherson and Bacow, 2015). International students represented only 1% of fully online programme enrolment in 2013, although institutions are seeking to expand this market (Deming et al., 2015). MOOCs are different in that their participants are typically more educated and more often international.

Online learning takes various formats. In most cases, lectures are offered asynchronously. Minimalist fully online learning is simply the broadcasting of taped live lectures, but what most distinguishes online learning from earlier TV or radio distance education programmes is the potential for interaction, through chat rooms or even instant machine generated feedback (McPherson and Bacow, 2015). Various blended or hybrid uses of online delivery complement in-person instruction, such as flipped classrooms where lectures are recorded and class-time use is interactive.

In principle, the online format can overcome barriers of geography and scheduling (such as conflicts with employment or childcare) (Escueta et al., 2017). Online education may also better serve students with certain disabilities. However, perhaps the most cited advantage of online learning is greater affordability. Efficiencies can result from larger class sizes (i.e. economies of scale), less face-to-face interaction, and from allowing institutions to fill gaps in course offerings with offerings from other institutions (Deming et al., 2015; McPherson and Bacow, 2015). The cost reduction piece is of special to institutions and governments, given very few innovations in higher education promise major efficiencies, which has led some to worry that online learning could provide cover for damaging cuts (Deming et al., 2015; Deming, Lovenheim, et al., 2016).

Lower costs have characterised online higher education in the United States, particularly in the public sector (Deming et al., 2015). The cost of online degrees fell 34% from 2006 to 2013, likely due to competition for students (Deming, Lovenheim, et al., 2016). Deming, Lovenheim and Patterson tracked the competitive impacts of online provision on other non-selective higher education institutions (typically the closest competitors), taking advantage of the 2006 policy change that permitted the expansion of online higher education delivery, as well as differences in internet penetration. They found that expansions of online offerings provoked increases in per-student instructional spending, as well as enrolment declines among other institutions, particularly in local markets with few brick-and-mortar institutions. Non-selective institutions concentrated the enrolment effects, whereas public institutions and 4-year colleges increased their spending. Interestingly, online competition appeared to increase tuition, perhaps to compensate for lost revenue and given financial aid policies limit price competition. These findings suggest online learning can help improve system-wide productivity by expanding competitive pressures for institutions to improve their performance.

The key potential trade-off of online learning is lower quality due to more difficulties among students who rely on externally provided structure, less opportunities for networking and interaction, and possible the loss of benefits from face-to-face contact (Deming et al., 2015). Efficiencies at the expense of dramatically lower quality would be no efficiencies at all. Escueta et al. (2017) identify nine experimental studies examining

the effects of online courses in the United States. Seven randomised control trials (RCTs) compared student learning from online, blended and face-to-face delivery, one regression discontinuity design (RDD) examined if an online degree option increased enrolment, and one RCT tested how employers respond to applications from online programme graduates.

Initially, non-empirical research suggested that student learning was equivalent for online and in-person courses (Carey and Trick, 2013). RCTs, however, consistently find that students are less successful in fully online courses, but there are no differences in face-to-face and blended learning courses. One limitation of the RCTs is their overwhelming reliance on random assignment of undergraduate students at relatively selective four-year US colleges for specific economics or statistics classes.

In likely the best study on the effects of online learning, Bettinger et al. (2017) use an instrumental variables approach to compare the outcomes of over 100 000 students over four years at a US for-profit college where various programme characteristics support the hypothesis of random assignment to highly comparable online and in-person classes. They find that taking a course online reduces: student grades in the course by one-third of a standard deviation, generally considered a large effect; grades in future courses by one-eighth of a standard deviation; and probability of remaining enrolled one year later by over 10 percentage points. This study does not constitute a full welfare analysis as it cannot compare the scale of reduced learning to the potential economies of scale in education delivery, nor other less observable benefits and costs (e.g. convenience utility), but it nevertheless finds very large effects.

Bettinger et al. and other studies have also found outcomes in online courses vary more among students (Goodman et al., 2016). In particular, students whose GPAs were weaker prior to taking the courses do worse. Observational research also indicates that advantaged populations participate and succeed more in MOOCs, thereby potentially exacerbating rather than reducing disparities in educational outcomes (In Escueta et al., 2017). Completion rates for MOOCs average just 7% to 10% (Freitas et al., 2015).

Goodman, Melkers and Pallais' (2016) RDD study evaluated the effects on higher education access of the Georgia Institute of Technology's (GeorgiaTech) Online Master of Science in Computer Science (OMSCS). This programme is considered the first where a highly ranked US institution (a top-ten computer science department) offered an online degree programme at equivalent status to its in-person degree (not labelled as online) and a much lower tuition rate (one-sixth). The study found that this single programme alone was set to boost the US' annual production of computer science master's degrees by approximately 7% and by as much as 10% if persistence to graduation reaches 90%. Among applicants narrowly not admitted to the programme, few pursue another higher education programme, while the programme attracts older and more local students than the in-person degree with almost no overlap between the student bodies. Meanwhile, online students perform slightly better in final exams than in-person students despite appearing to have weaker preparation at entry, and they persist at higher rates than in many other online programmes. Goodman, Melkers and Pallais argue that other mid-career programmes such as MBAs may be very amenable to similar models, and other institutions appear to be following GeorgiaTech's lead.

In the last RCT, Deming et al. (2016) applied for real job postings using fictitious resumes, and compared call-backs for graduates from for-profit online institutions and non-selective public institutions. Business graduates of the online institutions were 22% less likely to receive a call-back, as were graduates in health fields except for jobs that

required an occupational license or similar "external quality indicator". This study key limitation is the difficulty in distinguishing the effects of institutions being private from them delivering courses online (Escueta et al., 2017).

In part due to superior student outcomes, many authors suggest hybrid approaches could be more efficient than fully online learning depending on how they complement in-person provision (McPherson and Bacow, 2015). McPherson and Bacow suggest that replacing discussion sections would generate the greatest savings in the United States, but require the expensive development of interactive technologies.

Bettinger et al. (2017) note that online education could continue improving, while McPherson and Bacow (2015, p. 146) argue it is "likely to get better – and probably dramatically better – over time". RCTs on MOOCs have focused in particular on how to improve instruction, often using behavioural economics approaches (i.e. *nudges*), and seven of nine that Escueta et al. (2017) review found positive effects from at least one type of treatment. Developing the potential for enhanced interaction and creating adaptive learning systems will be essential to improving online education (McPherson and Bacow, 2015). As of yet, sophisticated computer-adaptive instruction is not in widespread use, McPherson and Bacow describe it as "in its infancy". Most improvements will likely result from learning by doing on the part of individual faculty and innovators, which takes time.

Improvements in ICT, coupled often with advancements in understanding of human behaviours though cognitive psychology and behavioural economics have produced a host of new tools to help improve outcomes in higher education. These technological improvements could have extensive implications even for face-to-face instruction in areas of course management, assessment, and pedagogical support, but are viewed as especially key for improving quality and achieving scale in online instruction (CENGAGE, 2016).

The development of advanced processing technologies may permit automation of some tasks such as grading and feedback of certain types of assignments. Combined with adaptive technologies, programmes may also better identify and meet the specific needs of individual learners. Cengage describes the development of resources with adaptive and customisation capabilities, including assessment and analytics, to support learning outcomes for specific contexts and learners as the future of OER, and presumably other educational resources (CENGAGE, 2016).

The Escueta et al. (2017) review of empirical evidence from RCTs and RDDs also indicates how technologies can complement core instruction to improve learning outcomes. Computer-assisted learning programmes centre on the use of software packages to develop specific skills, frequently as a complement to core instruction, and the review found that computer-assisted learning programmes have demonstrated "enormous promise in improving learning outcomes", particularly in mathematics, among students in compulsory levels of education. Technological applications of behavioural economics have focused mainly on improving transitions into higher education and achieved mixed outcomes overall, although certain initiatives have achieved dramatic gains. Other studies have explored behavioural interventions to improve completion of MOOCs, with positive results.

It seems that greater investment than often expected will be necessary to improve the quality of online learning. For example, less frequent updates undermine course quality, but updating online courses requires not only editing course content, but producing new video, potentially modifying software, and other changes that require time, involve wider

teams beyond just the instructor, and increase costs. Technology improvements may reduce the cost of providing courses of a given quality, but as McPherson and Bacow (2015) argue seem certain to spur the addition of new, pricey features. Stanford University's President has estimated that producing a first-rate highly interactive digital course is likely to cost millions of dollars (in McPherson and Bacow, 2015). In fields such as statistics, Carnegie Mellon is developing among the most sophisticated online courses, but these cost approximately USD 1 million each and are still not fully computer adaptive. The prevalence of for-profit college chains in online instruction also underlines the importance of economies of scale to online learning. It may be especially difficult to finance upper-level courses that have lower demand, as compared to basic introductory classes in popular fields.

In general, private sector companies or other dispersed researchers have developed and distributed these technologies in collaboration with institutions or often institutional consortia (Online Learning Task Force, 2011). In many cases these technologies take the form of software, which can deliver important economies of scale as a result of high development costs but low per user costs. It seems that typically, institutions make use of these types of technologies through outsourcing, although this may at least lend itself to joint procurement as a collaborative approach.

McPherson and Bacow (2015) suggest that the most sophisticated and highest quality programmes are likely to be too expensive for provision by a single institution. They view institutional collaborations as a key pathway to share development costs, perhaps through the intermediary of platforms like Udacity and edX. In a study of nine inter-institutional online programmes in the South and Midwest of the United States, no institution reported that it could have offered programmes on its own (Lasseter, 2008). Resource scarcity, in terms of financial resources but also technical infrastructure and skilled faculty, was the primary motivation for collaboration, which also allowed the institutions to achieve sufficient enrolment. State systems also provided financial and other supports for many of the programmes. Brick-and-mortar institutions also widely collaborate to proctor exams.

GeorgiaTech's OMCS seems to provide a counterpoint to these views. It has offered 30 courses, each of which initially cost approximately USD 300 000 to produce, though production costs have since dropped to less than USD 200 000. Each course uses original videos and other materials. In 2015, the programme generated net revenues of USD 2 million dollars and it paid back its initial development investment the next year. Of course, the programme has still reached significant scale, and GeorgiaTech had collaborators: AT&T provided USD 4 million to supplement institutional start-up funds and Udacity helped with the programme platform.

Beyond cost structures and technology, other important barriers to the expansion of online higher education in the United States relate to political economy and regulation.

Online learning threatens traditional patterns of autonomous practice among faculty (McPherson and Bacow, 2015). It requires that faculty work with supporting teams, but also can facilitate monitoring of course content, as well as faculty performance in terms of speed of student interactions and feedback, and student results. Faculty may also not want to "be facilitators of someone else's course" and resist participating in courses built other professors' online lectures. For example, San Jose State University faculty opposed the use of a Harvard Professor Michael Sandel's course on "justice". Online courses are also more difficult than written materials for faculty to take apart, select from and reorder for their own purposes. Resistance to this type of collaboration may vary by field, and computer science may continue leading the way. In 2014, Yale allowed its students to

watch Harvard "Introduction to Computer Science" lectures online and then attend sections co-ordinated by Harvard colleagues but taught by Yale faculty and graduate students.

Prestigious institutions may have a collective action problem in delivering efficient online learning, as a perception of cheapened products could harm their reputations (McPherson and Bacow, 2015). Moving forward in a co-ordinated way could mitigate this concern, while also sharing development costs and providing some joint QA, but antitrust policies could be a barrier to this kind of approach.

Online instruction also has important intellectual property implications. At most US institutions, faculty own the copyright for the course materials, lectures and textbooks that they produce. To justify the considerable investments to develop high-quality online courses, institutions will need some ownership rights over related intellectual property, however. Otherwise, it will be unclear if institutions can modify courses without faculty permission, and what occurs after faculty leave institutions. To resolve this challenge, institutions and faculty will need to develop new ownership and revenue sharing models, including new conflict-of-interest and conflict-of-commitment policies. In terms of MOOCs, at least one provider has left ownership with the instructor and institution and asked for a non-exclusive license to the content (Butler, 2016).

Another copyright related challenge is the use of materials in online courses (Butler, 2016). Institutions may be at risk of copyright infringement if they are not careful (Picciano, 2015). This is a complex legal area this paper cannot address in depth, but it is worth noting requirements under the TEACH Act, which has sought to facilitate the use of copyright materials in online learning (In Butler, 2016):

- Materials cannot have been produced or marketed primarily for use in distance education
- Portions of dramatic works (e.g. plays and films) must be "reasonable and limited"
- Access to content must "to the extent technologically feasible" be limited to students enrolled in the course
- Technological protection measures should be used so that works displayed are only accessible during class session and cannot be redistributed by students to others
- Any Digital Rights Management used by rights holders should not be tampered with.

Basically, online education can use the intellectual property of unaffiliated parties where they fulfil certain conditions, which include protecting it from illegitimate use. Yet some institutions have found such requirements difficult to meet, and they clearly raise costs. Restrictions and licensing costs are particularly strict for for-profit providers, including many MOOCs.

Policy approaches to open educational resources

The United States

The William and Flora Hewlett Foundation define OER as "teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge" (in CENGAGE, 2016, p. 2). US foundations like the Hewlett along with universities with large endowments have been OER pioneers. In 2002, MIT launched OpenCourseWare and over 100 universities now make all notes, course materials and videos available for open access through the OpenCourseWare Consortium (CENGAGE, 2016; Freitas et al., 2015).

Textbooks have been the highest profile OER products. Over USD 3 billion per year in financial aid supports textbook purchases, which may account for one-quarter of the average US student's costs to attend higher education (Annand and Jensen, 2017). Other research (in Annand and Jensen, 2017) found that almost two-thirds of students do not purchase required textbooks due to the cost, while most of these students report that this will negatively affect their course results. Five publishers control 80% of the textbook market.

One-fifth of US degree-granting institutions reported using OpenStax OER texts in a 2016 study (in CENGAGE, 2016). Another study found that approximately 4% of faculty used OER as primary instruction materials, with rates higher in computing and mathematics and lower in psychology and English (in Annand and Jensen, 2017). OER is clearly still modest in scope, but the question is how fast will it grow? Some authors anticipate rapid growth once OER reaches a critical mass (with 15% instructor usage one suggested tipping point) (Annand and Jensen, 2017). Major publisher Cengage (2016) predicts that within five years OER could make up 12% of the primary courseware market and 19% of the supplemental market.

Locating, evaluating and incorporating materials present the most important challenge for the widespread adoption of OER. In one major survey, 51.5% of faculty cited the absence of a comprehensive catalogue as a major barrier and 42% "difficulty of finding what is needed" (CENGAGE, 2016). Two additional surveys of 2 000 and 3 000 faculty confirmed these basic findings (Annand and Jensen, 2017)

Faculty may also worry about the quality or usability of OER. Faculty users rate OER as excellent quality less often than traditional resources (31% versus 56%), although 60% still report being highly satisfied with OER materials (CENGAGE, 2016). Faculty indicate that OER are more current, but inferior in terms of: their range of subjects and materials for each subject; mapping to learning outcomes; and trust in quality. Many faculty also do not understand permissions for use (CENGAGE, 2016).

At a more basic level, OER needs to continue to raise faculty awareness. One survey found that between two-thirds and three-quarters of faculty in the United States are not very aware of OER, although a majority indicate that they appreciate the concept and would be willing to use OER materials in the future (in CENGAGE, 2016). Commercial publishers enjoy clear marketing advantages (Annand and Jensen, 2017).

Over 35 states have adopted policies to support the creation and adoption of OER. California, Connecticut, North Dakota, Oregon, Texas and Washington, for example, have provided funding support (CENGAGE, 2016; Open Policy Network, 2016). Specific initiatives include the State University of New York Open Textbooks project, and the Washington State Board of Technical and Community Colleges Open Course Library (Carey and Trick, 2013). The United States' largest funding programme to promote OER was federal, however. The Trade Adjustment Assistance for Community College and Career Training programme spent USD 4 billion over four years to expand training opportunities following the financial crisis. The Department of Labor (DoL) required that all grantees make training resources and other copyrightable works available in a repository under a Creative Commons Attribution license. As of 2016, resulting materials had been downloaded over 100 000 times. One political challenge was an ultimately defeated proposal during the process of Congressional approval that would have prevented funds from helping to develop resources otherwise available for purchase, licensed, or under development in the marketplace, thereby protecting established providers of educational resources and preventing the development of new business model opportunities from OER (Stacey, 2013).

In 2015, the DoL became the United States' first agency to require that all copyrightable works produced using its competitive grants be open licensed, and the Department of Education (DoE) since followed suit (Open Policy Network, 2016). The Federal DoE and the Department of Defense, with support from the White House and other partner organisations, have also been developing a Learning Registry to aggregate data about learning resources available online (including publishers, locations, standards alignment, ratings, reviews and more). As of 2016, the Registry had catalogued 120 000 resources, 75% in science (physical, life and applied), mathematics and education. This represents only a small fraction of existent resources however. For-profit and non-profit organisations are developing other platforms for facilitating access to OER resources.

In 2013, the White House also directed agencies with large research budgets to provide open access within 12 months to all publications reporting the results of research grants, building on a policy that the National Institutes of Health adopted in 2008 (Harkin and Hazelkorn, 2014). In terms of works belonging to the government itself, under copyright law almost all are in the public domain.

France

France's Ministry of Higher Education and Research (MESR) began promoting OER in 2004 to support student success, promote the adoption of digital techniques by teachers, and increase the international visibility of the French higher education system (Touzé, 2014). Funds backed the creation of Digital Thematic Universities (Universités Numériques Thématiques – UNT) providing access to OER in different disciplines (EADTU, 2016a). As of 2014, the UNT had made 23 000 resources available online, with digital products supported through the creation of a virtual video library (Touzé, 2014).

In 2013, the government's "digital" agenda expanded its OER efforts (Touzé, 2014). Initiatives included:

- Creating the "France Digital University" (France Université Numérique – FUN) platform to host all French MOOCs and admit foreign higher education institutions in the future, using edX technology (EADTU, 2016a). The FUN aims

- to support institutions' production and use of high-level digital training, partly through collaboration with the private sector.
- MESR joined the OCW Consortium and launched OCW France to foster "referenced, deliberate and visible digital teaching, freely accessible at the service of the students and teachers of universities". All the UNTs' OER is now accessible through this gateway.
- Funding for a National Digital Council that provides guidance on the development of OER, for example recommending that institutions publish OER on external repositories instead of their own websites to facilitate accessibility (EADTU, 2016a).
- Investments to create 500 positions over four years supporting digital skill development in higher education institutions, as well as EUR 12 million to support the development of high-quality digital courses and programmes (Touzé, 2014).

Notwithstanding these efforts, it is not clear that uptake of OER in France has reached hoped for levels. Other ministries aside from MESR have participated in the creation of OER to such an extent that aligning disparate efforts across the government has been a key challenge.

In France as in other jurisdictions, the use of digital technology for instruction has raised serious questions about intellectual property, which may undermine the adoption of OER (Touzé, 2014). Under French law, a "pedagogical exception" allows the use of multimedia documents in instruction. In an effort to improve clarity for users, the government amended its legislation on the use of works in instruction in 2013. The education ministries have also signed agreements with rights holders to permit more flexible digital use of intellectual property in public higher education institutions. Still, analysts consider these negotiated agreements insufficient and that the "pedagogical exception" remains complex and difficult for users to understand.

Germany

Despite being a relatively latecomer to OER, 166 German organisations were involved in OER-related practices supporting 104 services as of 2017 (Orr et al., 2017). The Federal Ministry for Education and Research (MER) has sought to support these organisations and encourage them to collaborate.

The MER began funding the Forum for Digitalisation in Higher Education in 2014 to help inform practice and policy with respect to new digital technologies, and encourage OER and other collaborations. From 2014 to 2016, the government also pursued multiple OER reviews, which identified OER as offering numerous advantages, but found that the absence of public funding and poor knowledge and tools to use OER were holding Germany back.

In response, MER has funded the OERInfo programme with two major elements: creating a central information website with high-quality information about OER, and 21 train-the-trainer projects to support the development and distribution of OER. The total funding envelope is EUR 6.6 million, with EUR 1.2 million dedicated to the website. Despite not being the initiative's exclusive focus, higher education institutions have been heavily involved. MER is also supporting the training of staff in relevant digital skills through the Quality Pact.

Länder have also pursued significant OER initiatives. Starting in 2015, the city-state of Hamburg provided EUR 11.7 million for a local public university consortium to create the Hamburg Open Online University (HOOU). The HOOU aimed to create local and national momentum for OER, learning from how the Netherlands and the United Kingdom's open universities helped expand the use of OER. It concentrates on promoting media-didactical innovation and developing a platform for OER, supported by content development. The HOOU's approximately 60 OER projects to date have included courses. The consortium behind the HOOU had previously worked on programmes promoting innovation in education, research and administration through ICT.

Baden-Wuerttemberg has also spent EUR 250 000 to support the establishment of a central OER repository for its 48 higher education institutions, based at the University of Tubingen. The project focuses on library infrastructure and does not address innovation in pedagogy. Finally, North Rhine-Westphalia launched its Digital University NRW in 2016, aimed at bundling the resources of participating institutions to address challenges relating to the digitalisation of education, research and management. OER and open approaches make up only a small part of this initiative, making this an example of mainstreaming OER into a broader programme.

Germany's Act on Copyright and Related Rights was enacted in 1965 and has been described as "requiring fundamental restructuring" to cope with developments from ICT. Yet, no major reform has yet occurred. The act has no fair use clause for intellectual property, in contrast to many common law countries, and establishes very strict limitations on use. This has resulted in frequent use of cease-and-desist letters, some claiming damages, at times even regarding materials that have been used pursuant to creative commons rules. The courts have often been called upon for decisions, although as of yet in no cases regarding creative commons materials. If a general clause on fair use were introduced this would likely allow the courts to establish clearer guidelines. However, some suggest the dysfunctionality of Germany legislation may actually be facilitating the development of OER because users have few feasible alternatives.

Privacy legislation is also relevant to OER and Open Education. In Germany, Europe's privacy laws prevail and they are among the strictest in the world. To obtain data, researchers typically must obtain the subject's consent for a specific purpose, and institutions have data protection officers to ensure compliance with regulations. These protections have implications particularly for learning analytics that can provide insights into learners' characters and capabilities. Storage of data outside the European Union is also strictly limited, which may restrict collaboration with US firms.

The United Kingdom

The United Kingdom's Joint Information Systems Committee (JISC) and the Higher Education Academy launched their Open Educational Resources (OER) Programme (OERP) in 2009/10, with GBP 13.5 million over three years from HEFCE (Stacey, 2013). The OERP's general objectives were to promote sharing and reuse of learning services and boost the higher education system's reputation by disseminating UK-developed learning resources internationally. By year-three the OERP was working to: develop post-graduate certificates incorporating open access approaches; embed open practices content in accredited continuing professional development for academics; embed OER in institutional change models; and promote innovation extending OER beyond traditional practices. Specific areas of OERP activity included: curriculum development; research

and guidelines on OER development, management and sharing; business case proposals; and other guidance and support.

The United Kingdom Government is also supporting the Futurelearn Initiative, which is developing a MOOC platform to compete with those based in the United States (Carey and Trick, 2013). Futurelearn is a consortium of 17 universities, under the leadership and majority ownership of the Open University.

The UK Online Learning Taskforce's 2011 review considered that competition among UK providers in OER and online learning would diminish the United Kingdom's global market share, whereas collaboration could strengthen international competitiveness. The Taskforce underlined the government's key role in providing financial support for online instruction, the development of OER, and the sharing of learning experiences, as for example through the OERP.

British Columbia (Canada)

On a per capita basis, the Canadian Province of British Columbia's (BC) Online Program Development Fund (OPDF) is among the largest ever government programmes to support OER development (BCcampus, 2017b; Stacey, 2013). It operates under BCcampus. From 2003 to 2012, the OPDF invested CAD 9.5 million pursuing three core goals:

1. Support partnerships among public higher education institutions to develop online learning resources that fulfil a mutual academic need
2. Increase credential opportunities for students by developing resources for credit
3. All resources must be licensed for free reuse, revision, remix and redistribution.

The OPDF's 153 grant projects engaged all of BC's higher education institutions. Outputs included 362 open licensed courses and 425 open licensed course components, along with 12 workshops and 20 websites. Whereas OER initiatives tend to focus on the development of new resources, but not the reuse of materials prepared by others, the OPDF somewhat uniquely required that grant applicants show how new resources would integrate OER materials developed in previous funding years or from elsewhere in the world (Stacey, 2013).

Beginning in 2012, the OPDF began supporting BCcampus to develop open licensed textbooks for students in the most popular courses at local public institutions (Open Policy Network, 2016). The open textbooks programme has now amalgamated 150 open textbooks, for nearly 15 000 students in over 500 courses, saving students as much as CAD 1.8 million in total. BCcampus created only 60 of the textbooks, the rest were adapted or reused from other jurisdictions. In 2014, BC and two other provinces signed a memorandum of understanding to try to expand the programme further.

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