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Does High-Quality Research Require "Critical Mass"?

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Charles Clarke, the UK's education secretary from 2002 to 2004, once asked: "Should we enable more of the best researchers to focus on research, and develop a more professional teaching force for universities specialising in teaching?" The drift of research funding decisions in British universities since then has been to concentrate resources on a few key institutions that already command the bulk of research finance. We have been told that world-class research requires "critical mass", and this is to be found in the "golden triangle" formed by Oxford, Cambridge, and London; those institutions elsewhere that do not have critical mass would be better left without any research funding at all than encouraged to continue to waste national resources on the small-scale, low-value projects that are the only kind of work they are capable of.

Is there critical mass in research? How big is it? These are essentially factual questions; no doubt the truth varies, depending on whether we are talking about art history or particle accelerators. In any case I do not claim to know the answer. But I am thoroughly familiar with the question, which has been asked before. In my own research I have studied how government officials in the USSR allocated scarce funding among competing research and development projects in Soviet aero engineering in the 1930s and 1940s². What we find is that, in the secret military core of a command system dominated by a harsh dictatorship, nobody was able to make a lasting decision about the best way to organise research. On one side were proponents of competition. They believed that the right framework within which good ideas for the future of aerospace could best emerge and be most easily spotted and selected for further development was to spread the limited funding available over many projects. Many would fail but a few would succeed and that would be enough. On the other side were the advocates of concentration. They found the waste and duplication of competitive funding unacceptable. An advantage of the planned economy, they argued, was its potential for bigger projects that could be controlled more tightly from the centre: in short, a potential for "critical mass".

¹ *Editors' note:* Professor Mark Harrison was not present at the workshop. However, his short note, written in July 2003 in the context of a national debate on university funding in the UK, remains topical. We thank him for granting us permission to include it in this compilation.

² For results see Harrison (2003), "The Political Economy of a Soviet Military R&D Failure: Steam Power for Aviation, 1932 to 1939", *Journal of Economic History*, Vol. 63, No. 1, pp. 178-212; Harrison (2005), "A Soviet Quasi-Market for Inventions: Jet Propulsion, 1932 to 1946", *Research in Economic History*, Vol. 23, pp. 1-59.

The result was an institutional cycle. In the first phase of the cycle, competition ruled. Soviet funding officials would announce a new mission, for example, to build a new type of engine. Many hopeful designers would set out their research proposals. Behind closed doors they lobbied and negotiated for funding; sometimes they even diverted funding from an existing project to a new one to get a head start and win some credibility. It was hard for officials to decide who had the best chance of success so the cash was shared out among many. As the work got under way the projects already funded tended to attract further financing more or less regardless of results; after all, by now money had already been committed and it became hard for funding officials to cut off projects they had authorised previously without looking bad because they had nothing to show for it. At the same time new technological possibilities began to emerge from the work already done so still more projects were designated and authorised. Funding obligations multiplied. At a certain point the higher Soviet authorities lost patience with rising expenses and lack of results, and announced a turn to "critical mass". The problem, they declared, was that money had been scattered over too many small-scale, low-value efforts; there was a need to concentrate efforts and focus them more narrowly. The second phase began. Who would lose funding? Some designers fought back: they lobbied defensively to protect their funding, or they acted aggressively to try to gobble up the organisations of other designers in a weaker position. In the outcome, however, judgements had to be made and funding removed from those projects judged less successful, which were terminated; the money saved could then be concentrated on a smaller number of bigger projects that reflected a narrower mission and more sharply defined priorities.

In the process research monopolies were created that went on to behave like monopolies: they consumed resources, increased costs, and restricted output. Moreover, in the rush to rationalise, the officials in charge of funding generally made some mistakes. They would have liked to curtail only bad projects and save the good ones, but they often made bad decisions, sometimes out of ignorance or myopia, sometimes because they were swayed by the influence of designers who were better at lobbying and persuading than at organising research. And yes, such people do exist, even among high-minded academics at top universities. Once it was realised that the concentration drive had gone wrong the arguments in favour of competition and pluralism tended to be rediscovered. The cycle began again.

Of course there are some differences between the cycle that we find at work in the Soviet command system under Stalin and the working of our own research councils and department of education under Charles Clarke. In Britain today no one is shot or imprisoned for a mistaken funding decision or a faulty design. Personal consequences aside, however, the parallels are remarkably similar. The underlying reason is that in both cases we are dealing with research for the value of which there is no good market test, but there is no good bureaucratic test either.

I predict, therefore, that five or ten years from now another education secretary will discover that today's policy of concentrating research funding in pursuit of "critical mass" was mistaken, or at least was taken too far. The monopolistic research giants of the golden triangle will receive stinging criticisms for their lethargy, bureaucracy, and capacity to absorb funding without giving results. There will be much wisdom after the event. We will hear speeches full of regret for the blight that the theory of "critical mass" spread

through Britain's higher educational periphery in the first years of the new millennium: the emerging research groups in second-rank universities that lost their funding, the small but promising centres closed, the individual careers curtailed. Ministers and research council chiefs will announce a new era of competition and pluralism, in which funding will be spread in small, rationed instalments right through to the periphery of the higher education system.

But the new era will again turn out to be shorter than anticipated. Ten or fifteen years from now yet another education secretary will be making a speech on – yes: the importance of "critical mass"!