

before a new drug may be introduced. Research and development activities of this sort are extremely costly, although there is a reasonable degree of assurance of commercial viability. They demand extensive resources devoted to scientific efforts which, however, may be fairly routine. Thus, a major share of pharmaceutical research should be considered as complementary, rather than competitive, to research activities outside the industry.

TABLE 3.—NUMBER AND PERCENT DISTRIBUTION OF SCIENTIFIC AND PROFESSIONAL MANPOWER ENGAGED IN MEDICAL AND RELATED RESEARCH, 1960

A. DISTRIBUTION BY SECTOR

	Level of training			
	Total	M.D. and D.D.S.	Ph. D.	Other
Number.....	39,700	11,400	18,000	10,300
Percent:				
Government.....	19.7	17.3	12.6	34.5
Industry.....	18.1	4.8	12.2	43.2
Universities and research institutes.....	62.2	77.9	75.2	22.3
Total.....	100.0	100.0	100.0	100.0

B. DISTRIBUTION BY LEVEL OF TRAINING

	Number	Percent		
		Total	M.D. and D.D.S.	Ph. D. Other
Government.....	7,800	100.0	25.3	29.2 45.5
Industry.....	7,200	100.0	7.6	30.6 61.8
Universities and research institutes.....	24,700	100.0	35.9	54.8 9.3
Total.....	39,700	100.0	28.7	45.3 26.0

Source: National Institutes of Health, "Manpower for Medical Research—Requirements and Resources, 1965-70," a report for the Committee on Appropriations, U.S. House of Representatives, February 1962, p. 24.

To consider this point further, it is useful to examine the data on educational levels of professional personnel engaged in medical research within and outside the pharmaceutical industry. The relevant information is presented in Table 3. As may be observed, 38 per cent of research professionals in the industry held doctoral degrees while 55 per cent of government researchers and 91 per cent of professionals within universities and research institutes had attained this level. Moreover, although the pharmaceutical industry provided approximately 30 per cent of total expenditures on medical research in 1960, it utilized only 5 per cent of total personnel with the M.D. degree and 12 percent of those with the Ph. D. degree. It appears, thus, that industry resources competed with non-industry resources for scarce, highly trained personnel to a lesser extent than would be indicated by the total size of the industry effort, and also that these resources were used primarily for alternative, non-competitive purposes.

The growth of competitive product differentiation has been associated with substantial outlays on research and development; but equally significantly, it has been associated with a specific emphasis in its direction. Research is a generic term which covers a broad spectrum of activities, and thus the type or character of the research activities undertaken as well as their volume are important factors in an analysis of the relationships among market structure, research and technical change.