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   Sommario/riassunto   In these notes, we provide a summary of recent results on the cohomological properties of compact complex manifolds not endowed with a Kähler structure. On the one hand, the large number of developed analytic techniques makes it possible to prove strong cohomological properties for compact Kähler manifolds. On the other, in order to further investigate any of these properties, it is natural to look for manifolds that do not have any Kähler structure. We focus in particular on studying Bott-Chern and Aeppli cohomologies of compact complex manifolds. Several results concerning the computations of Dolbeault and Bott-Chern cohomologies on nilmanifolds are summarized, allowing readers to study explicit examples. Manifolds endowed with almost-complex structures, or with other special structures (such as, for example, symplectic, generalized-complex, etc.), are also considered.