This paper examines the semantic role of the preposition ‘a’ in NaN Italian complex nominals using a distributional semantic approach. Starting from the assumption that ‘a’ may introduce one the following \textit{qualia} relations (Pustejovsky, 1995) - Formal (F, introducing taxonomic information, such as shape in \textit{cacciavite a stella} ‘star screwdriver’), Constitutive (C, introducing information on parts, as in \textit{codice a barre} ‘barcode’), Telic (T, introducing information on purpose and function, as in \textit{barca a vela} ‘sailboat’) - we verified whether the difference in the semantic contribution of ‘a’ in T (‘a-telic’), F (‘a-formal’) or C (‘a-constitutive’) NaNs is confirmed by a semantic analysis performed using vector models. We generated meaning representations for each preposition ‘a’ using a distributional semantic approach. First, we extracted all NaNs with frequency > 5 from the 1.7B tokens itWaC corpus (Baroni et al., 2009). Then, two of the authors annotated them with F, C, or T according to the scheme in Bouillon et al. (2012). In total, annotators agreed on 66 NaNs (19 C, 21 F, and 26 T). Finally, we generated meaning representations for both NaNs and single Ns by training a \texttt{word2vec} model by Mikolov et al. (2013) on the whole corpus. Meaning representations for each preposition ‘a’ were obtained by subtracting the vector resulting from the sum of the nouns (e.g. \textit{barca}+\textit{vela}) from the NaN vector \textit{barca\_a\_vela}). The resulting vectors were then used for running a cluster analysis. With 3 clusters, ‘a-telic’ clustered together (78%), with ‘a-formal’ forming a relatively defined cluster (52%) and ‘a-constitutive’ being almost equally distributed among the clusters. With 2 clusters, the distinction turns out to be much clearer, with ‘a-telic’ items (76% in cluster 1) clearly distinguished from the ‘a-non-telic’ (83% in cluster 2). Interestingly, all the ‘a-non-telic’ clustered with ‘a-telic’ are constitutive.